


**Natural and Cultural  
Resources Management Plan  
and Environmental Assessment**

**Pu'uhonua·o·Honaunau**

**CITY OF REFUGE NATIONAL HISTORICAL PARK**

**HAWAII**



Digitized by the Internet Archive  
in 2012 with funding from  
LYRASIS Members and Sloan Foundation

<http://archive.org/details/naturalculturalr00hawi>

NATURAL AND CULTURAL  
RESOURCES MANAGEMENT PLAN  
and Environmental Assessment

CITY OF REFUGE NATIONAL HISTORICAL PARK  
HAWAII

Prepared By  
City of Refuge National Historical Park  
National Park Service  
Department of the Interior

November 1976



## TABLE OF CONTENTS

Summary	i
RESOURCES MANAGEMENT PLAN	1
Management Objectives	1
Maintaining the Natural Environment	2
Restoring the Historic Scene	3
Relationship to other Projects	10
Environmental Review	14
ENVIRONMENTAL ASSESSMENT	15
Description of the Environment	15
Natural Environment	15
Geology	15
Soils	18
Climate	19
Water Resources	19
Terrestrial Life	20
Marine Life	22
Cultural Environment	23
Archeology and History	23
Human Use	26
Future Environment without the Plan	20
Environmental Impact of the Proposed Plan	30
Maintaining the Natural Environment	30
Restoring the Historic Scene	31
Mitigating Measures Included in the Proposed Plan	33
Adverse Effects which Cannot Be Avoided Should the Plan Be Implemented	34
Relationship between Short-term Uses of the Human Environment and the	
Maintenance and Enhancement of Long-term Productivity	35
Irreversible and Irretrievable Commitments of Resources which	
Would Be Involved in the Proposed Plan	35
Alternatives to the Proposed Projects	36
Alternate Vegetative Management	36
Alternate Historic Preservation	37
Consultation and Coordination	39
Literature Cited	43
NEGATIVE DECLARATION	44
MANAGEMENT PROGRAM	45

## LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>	<u>Page No.</u>
1	Resources Map	ii
2	Chief's House Site	7
3	Holua Slide	7
4	Boundary Proposal	11
5	Location Map	16
6	Island of Hawaii	17

## Summary

The City of Refuge Natural and Cultural Resources Management Plan proposes actions to maintain the natural environment and to stabilize the historic scene. Native Hawaiian plants will be raised on a 3.7-acre parcel to supply park demonstrations and for replanting. Exotic plants will be removed and native plants will be reintroduced, on a selective basis. Vegetative clearing on approximately 125 acres will uncover and free archeological remains of overgrowth and will reduce a significant fuel build-up.

Archeological and historical work will encompass actions of varying degree--from preservation to historical restoration. Such actions are proposed for the refuge area ruins, chief's house complex, Alahaka-Keanaee ruins, Keokea temple ruins, Ki'ilae village, and a holua slide.

Each proposed plan action will be documented in accordance with the Advisory Council's Procedures for the Protection of Historic and Cultured Properties (36 CFR 800) which governs compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593 of May 13, 1971.



**Fig 1. Resources Map**

SCALE IN FEET  
0 800 1600  
0 240 480  
SCALE IN METERS



## RESOURCES MANAGEMENT PLAN

### Introduction

City of Refuge National Historical Park (NHP), a registered national historical site in Honaunau, Hawaii, encompasses 181.85 acres set apart by act of Congress for the benefit and inspiration of the people. It is administered as a historical area of the National Park System. A composite natural and cultural resources management plan is herein proposed. The plan is an attempt to protect this example of prime historic scene in a small coastal area, surrounded by lands with potential for recreation and resort development, and to remedy any incursions upon it.

The prime cultural features of the park are the pu'uhonua or place of refuge, Hale-o-Keawe or House of Keawe, Ki'ilae village, and supporting villages and sites. The shore of Honaunau Bay and its clear waters serve as the park's prime natural asset. Figure 1 schematically shows the cultural and natural resources at City of Refuge.

The primary interpretive theme is refuge in the ancient setting of Honaunau Bay and vicinity, the Hawaiians' adaptation to their environment--represented by stone structures and features--and historical periods represented at Ki'ilae village. The present interpretive program is based on ethno-historical sources as recorded by non-Hawaiian visitors, mainly missionaries, and a few sources from Hawaiian scholars such as David Malo and John Papa Ii. For the pre-historic period before 1778-79 the chronology is unsupported by basic data because no archeological research had been done at the City of Refuge until 1968. Archeological methods will be applied to gather data to support or modify the interpretive story. Ideally, when the park is fully developed it will represent a slice of time from pre-contact (1700) to about 1926 when Ki'ilae village was completely abandoned. This plan stresses the pre-contact period and the preservation of resources which relate to the later periods.

### MANAGEMENT OBJECTIVES

The following resource management objectives, derived from the park master plan, serve as a basis for park planning:

Preserve and interpret selected historic structures through stabilization and historical restoration.

Continue detailed studies on specific prehistoric features for park-wide interpretive programs and preservation. Protect and preserve these archeological features through stabilization.

Give special attention to ecological research on the intertidal zone and to means of giving it adequate protection for interpretation.

Continue studies of exotic vegetation as a basis for implementing an urgent control program and a program of replanting native vegetation.

Provide fire protection for the reconstructed Hale-o-Keawe without affecting the aesthetics and authenticity of this thatched structure.

Expand boundaries and acquire necessary interest in lands as required for conservation of the historic scene and inclusion of the marine resources.

Continue and encourage the traditional Hawaiian uses of the land and sea.

A combination of research and management actions are proposed to carry out these objectives. Proposed actions to maintain the natural environment will be discussed first, followed by proposed actions to restore the historic scene. Before any plan action is undertaken, a determination of effect on cultural resources and consultation with the State Historic Preservation Officer will take place. The archeological and historical work will be under the direct supervision of the Service Pacific Archeologist or Pacific Historian.

### Resources Management Actions

#### MAINTAINING THE NATURAL ENVIRONMENT

Resources management in a historical area aims to perpetuate the historic scene of the commemorated period. In so doing, no conditions that lead to erosion or human-caused deterioration of cultural resources will be re-created.

Propagation of native plants. There is a detached 3.7-acre parcel along the approach road about two miles from the main park to be used as a nursery for native plants (figure 4). The detached parcel is covered with exotic plants and only a few native plants. Clearing and cultivation are required to supply the park's cultural demonstrations and replanting program. The detached parcel is situated 1,000 feet above sea level and is within the altitude belt of vegetational transition between coastal and upland forest. The present vegetation is dominated by introduced Christmas-berry, haole koa, and lantana. Kukui trees, hoi (bitter yam), and ground ferns are native components. Historically, the more arable areas were modified by walls for dry-terrace cultivation of crops such as taro, sweet potato, sugar, and wauke (Yen 1971). Less arable areas were covered by natural tree stands and intra-planted with breadfruit trees, and at the margins, with yam, olona (a cordage plant), and olona (a yellow dye plant).

Partial clearings were cultivated with ti, 'awa, banana, and taro. Much later, coffee was planted in the general area without significant alteration to the field forms. Presently, neighboring tracts are being cultivated to grow plumeria, coffee, papaya, and macadamia nut. An environmental appraisal for the 3.7-acre parcel is on file at City of Refuge NHP and the Hawaii State Director's office in Honolulu.

Exotic plant control and native plant reintroduction. Growing conditions and lack of necessary management have resulted in widespread, firmly established exotics, such as kiawe, opiuma, and haole koa. Numerous archeological features are overgrown with vegetation which requires careful manual extrication. Vegetative management throughout the park will require ongoing control because invasion and regrowth are constant factors. In 1963, eighty acres were cleared of exotics. A combination of exotic plant control and replanting supplied by the City of Refuge upland nursery will encourage native plant reintroduction. Replantings will take place sparingly since the subject area was historically barren with only scattered pockets of grass and small shrubs.

The approximately 45 acres that generally lie on the shore, west of the 1871 trail, require highly selective vegetative management. Proposed control entails manual removal of exotic species and stump application of an approved herbicide. The grove of coconut palms on the palace grounds are generally even-aged and overmature. Replanting of about 35 trees is proposed. Overmature trees will be gradually replaced with sprouting coconuts. Each tree will be replanted in the same spot as its predecessor and the number of trees in the grove will be unchanged.

Areas that generally lie inland, east of the 1871 trail, are overgrown with thick brush. These areas encompass about 125 acres adjacent to more highly developed portions of the park. Kiawe and other shrubs typically crop up in lava crevices and some have matured to considerable size. Archeological features are obscured and are being destroyed by vegetation. Fuel build-up creates a fire hazard, considered critical during the dry season. Proposed vegetative clearing entails a combination of methods: manual removal with handtools and chainsaw; stump application of an approved herbicide; and broadcast application of an approved herbicide, or, manual removal of exotic grasses and forbs (which occur sparsely in depressed areas of lava flows). Whenever feasible, native pili grass will be planted in the park in scattered soil pockets. Most of the refuse will be chipped and hauled out of the park. Any marketable material will be sold, according to standard government procedures for the disposal of excess property.

## RESTORING THE HISTORIC SCENE

The historic scene is the overall appearance of all historic resources, including the landscape, sites, structures and objects, and their surroundings. Resources management encompasses actions of varying degree--preservation, stabilization, and historical restoration.



The archeological structures are dry-laid, stacked-stone (without mortar) that are structurally weak. They are easily affected by visitor movement near them or on them, as well as by the natural forces including frequent earth tremors. It is becoming evident that visitor impact is far more devastating than natural forces. A factor in the foregoing observation is the fact that Hawaiian stacked-stone structures were originally constructed for "one time use" and not for long time preservation. Most were not meant to carry the weight of large numbers of people over sustained periods of time. Therefore, efforts to preserve these structures "as is" start with a structure that has built into it "self-destructing" features. Preservation of Hawaiian structures require special methods, materials and techniques, and a recognition of special conditions both natural and cultural.

Excavation means archeological investigation specifically tied to stabilization and is not pure research. Most archeological sites at City of Refuge are on the pahoe-hoe surface. Stratified or buried sites are rare. Investigations relate specifically to recovery of structural data and removal of debris from around the structure to expose the site for preservation treatment and interpretation. Sub-surface exploration (excavation) is required only where footings (over soil pockets) in the structure are found to be poor. Therefore, excavation as a research tool is of limited use and is a by-product of the main objectives--stabilization for preservation.

At the City of Refuge loss of structural data and portable artifacts is from natural forces and increases in visitor traffic and not so much from vandalism. Preservation means impeding the destructive forces by stabilization and minimum reparation. Excavation to prevent loss of structural data and recovery of portable artifacts is applicable only to the old temple site where the ocean is washing away structural data and portable artifacts that might shed light on the chronological history of the pu'uhonua.

Refuge area ruins. In the pu'uhonua, the place of refuge, there are three temple sites that have been ranked chronologically from ethno-historical sources. The interpretive story, as told now, is based on this chronology. The Hale-o-Keawe, now reconstructed, was seen and recorded by Reverend William Ellis in 1823. The Bishop Museum, in their study in 1959, assigned the date of 1550 to the 'Alealea temple site and the Great Wall, and circa 1475 to the Old Heiau site. Since then, the National Park Service has discovered that the 'Alealea temple site (excavated and stabilized in 1967). consisting of several distinct and separate stages of construction, dates to 1150 A.D.  $\pm$  200 years, not 1550 A.D. This would place the 'Alealea chronologically at least 100 years before the traditional date of 1475 A.D. for the old Heiau site. The key, therefore, to the chronological history of the pu'uhonau and its function lies in what data can be recovered from what remains of the Old Heiau site.

Because of its location, less than one meter above sea level, seasonal high seas have now destroyed over 80 per cent of the Old Heiau site. The remaining 20 per cent continues to be eaten away at an alarming rate by the sea and by visitor impacts. In addition to the destruction from high seas and increased visitor use, the entire site is situated on a sinking coastline. According to Apple and MacDonald (1966) the coastline is sinking at the rate of about one foot per century. It is therefore conceivable that in less than 50 years the remaining 20 per cent will have been washed into the ocean. Valuable interpretive data -- structural and portable artifacts-- are being lost at an alarming rate. The remaining site must be studied, and support data collected and preserved.

Covering a portion of the southeast end of the Old Heiau site is a high water deposited beach that extends to the seaward end of the Great Wall. In order to locate some of the walls, platforms, pavements, and other features of the Old Heiau, trenches must be cut through this beach deposit from surface to pahoehoe level. In addition to these exploratory trenches, it is planned to place at least three other trenches in the beach, at least one meter wide, in an attempt to secure data from the "refugee camp sites." The trenches will be excavated in natural layers; the profile should give some details concerning these temporary camp sites in the pu'uhonua. Less than 5 per cent of the beach will be disturbed by this action.

In the Old Temple site it is proposed to:

- a) Locate all walls, platforms, and pavement areas on a detailed grid map and expose these features by careful removal of fallen debris.
- b) Stack the structural stones, in measured stacks, as an aid to determine structural height and size. Excess stones will not be taken from the area due to public relation problems.
- c) Disturb any burials as little as possible. (In 1919, Stokes of the Bishop Museum excavated and removed a number of burials, which were shipped to Honolulu). In this proposed action intrusive burials are expected to be found. First, if at all possible, the burials will not be disturbed, and second, if they must be disturbed, they will be carefully removed, boxed, and placed in the cave at City of Refuge prepared for that purpose, in accordance with established procedures.
- d) Identify test trenches excavated in 1919 and surface disturbances by Hawaii Home Guard during World War II.
- e) Process portable artifacts at the park.
- f) Design and approve research before any action is permitted.
- g) Publish a report meeting professional and Service standards giving the results of the excavation.

Without detailed knowledge of the remaining structural features hidden under the rubble it would be questionable to give a detailed stabilization treatment plan of the site at this time. However, in general, where the structure is found to be unstable the same methods used on the Great Wall will be used, i.e., take down the unstable portion and re-stack the

stones in the basic Hawaiian style (outside veneer wall with rubble fill) with interior modification to afford structural strength. Leave the portions that are stable and undisturbed alone; no re-building.

This project will be under the direct supervision of the Pacific Archeologist. A determination of effect (in compliance with 36 CFR 800) is being prepared in consultation with the State Historic Preservation Officer. Members of the Kona Hawaiian Civic Club and other interested people in the community have been consulted. A research design, in accordance with Service archeology standards, is being prepared for this project.

Chief's house complex. Low multi-level platforms within a walled enclosure are associated with the early to late historic Hawaiian life style. The platforms (figure 2) represent two major occupations; the original one was a modest-sized house and shelter. By 1848 the platforms supported no less than four structures: a men's house, a family house, a cooking shelter, and a women's eating and work house--all thatched. The platforms last held a board house. It burned down in 1952. Roots of the occupation of the site extend back into the pre-contact period.

Until interpretive or other needs justify the construction of typical thatched houses of a mid-nineteenth century chief's housing complex, the platforms and walls will be preserved through stabilization and repairs. The site was tested archeologically in 1968.

Alahaka-Keanaee ruins. In 1919 J.F.G. Stokes of the Bishop Museum identified a house complex near the Keanaee cliffs as that belonging to Keawe-nui-a-Umi that was later given to Kawelo by Uhai, the Konohiki of Keokea in 1840, and was then later occupied by Kiwala'o (probably misidentified by Stokes' informants; Kiwala'o was killed in about 1782 at the battle of Mokuohai). As stated by Stokes, this site "...is not only of great traditional interest but it exhibits the plans of a chief's establishment...", including three house platforms and an area that might have been a halau or shed. The enclosing wall may have been added after 1840 when the award was made to Kawelo.

Since the site's abandonment, its walls and platforms have been knocked down by cattle and goats and by continued use by night fishermen. Fishing is a traditional use of the land and sea which the Service is committed to let continue. The nearby ku'ula (fishermen's shrine) implies that this is a prehistorically important fishing location. Night fishermen who camp within the low walls and under the large kiawe trees and day use visitors have added to the site's destruction. Cattle and goats have been eliminated but fishermen and visitors still use the area occasionally. (Removal of very large kiawe trees that now attract modern day fishermen to the site may reduce the destructive impacts on the site). The walls, platforms, and other features are typical Hawaiian style, dry-laid construction which renders them structurally weak.





**Fig 2. Chief's House Site**



**Fig 3. Holua Slide**

It is proposed that the site be cleared of vegetation and a detailed map of the structure be made (a base map locating the site was made in 1963). Each structural failure will be identified and measured. The broken walls and facings will then be cleared of fallen stones. If the footings are sound under the rubble, the walls and facings will be stabilized as is; no rebuilding. If the footing stones are unsound and endanger other portions of the structure, the sub-surface soil layers, if any, will be investigated for portable artifacts and datable material that might shed light on the structural and cultural history, and the broken areas will be stabilized. The damaged and intact areas will not be disturbed.

The project will be under the supervision of the Pacific Archeologist. The Bishop Museum, Kona Hawaiian Civic Club and other interested people have been consulted and will be informed when the project is to start. In compliance with 36 CFR 800, a detailed case report will be made before any action is approved.

Keokea temple ruins. There are two temple sites in the ahupua'a of Keokea. One is the 'Oma'o Heiau and the other is the Alahaka Heiau.

The 'Oma'o Heiau, makai (seaward) of the 1871 trail, is a low platform structure that was seriously damaged by cattle, goats, and by the Hawaii Home Guard who used the vicinity as a rifle range. The facing walls are, in general, in a poor state of preservation. The surface (top of the platform) has been badly disturbed not only by cattle, goats, Hawaii Home Guard, and visitors, but earlier, by Hawaiians who put two intrusive graves in the platform. The regrowth of vegetation offers some protection for the site from visitors. However, the regrowth of shrubs, trees, and vines are slowly breaking down the platform. The site will be stabilized as is. The graves will not be disturbed even though they are later in age but will be interpreted as an example of Hawaiian burial practices in recent times. The 'Oma'o Heiau makes use of a natural feature, a volcanic squeeze-up, as part of its architecture for the anu'u or prayer tower. Normally, the anu'u is constructed of wood and found in both agricultural and war temples.



The second heiau, Alahaka, or way of the ladder, is also located in the land division of Keokea in the center of a village complex, consisting of surface dwellings and cave shelters. In 1957, Dr. Kenneth Emory of the Bishop Museum visited and described the site as follows:

It is remarkable for its facing of carefully fitted lava stones with a flat, vitreous surface exposed in the face of the wall...and for its pao or vaulted construction...all through the great part of the platform, glimpses into the hollow underpinning may be had, where the pavement has been torn up perhaps by curiosity seekers, perhaps for stones to build the goat pen 150 feet northwest. The southern end was lower; and distinct divisions in the pavement were originally present. A long, careful, and detailed study of the alignments and original surface pavements would enable a reasonably good restoration to be made of this heiau...Undoubtedly, it is a quite ancient heiau, probably contemporaneous with the Alealea heiau which has the same construction...

The Alahaka Heiau is located mauka (toward the mountain) of the 1871 trail and makai (toward the sea) of the Keanaee Pali. It is a platform type heiau which measures about 60 by 90 feet (18.30 by 27.45 meters) and varies in height from a few inches up to eight feet depending on ground level. Like 'Oma'o Heiau, it has suffered from cattle, goats, and people. The outside facing walls are easily followed above the rubble fill along the foundations. The top surface of the platform still has discernible alignments and divisions seen by Stokes and reported by Emory in 1959. Also, like 'Oma'o Heiau, portions of the surface have been later disturbed for what appear to be grave sites.

Before any action is taken a full and detailed appraisal (in compliance with 36 CFR 800) will be made in consultation with the State Historic Preservation Officer. The project will be under the supervision of the Pacific Archeologist. Bishop Museum staff members have been consulted. The Kona Hawaiian Civic Club and other interested local residents have reviewed the general stabilization plans and will be consulted again before the plan is implemented.

Ki'ilae village. Ki'ilae village today consists of some dozen fairly well-defined lots enclosed in stone walls and containing various house platforms, burial crypts, and other stone structures (figure 1). These walled enclosures resulted from both kuleana grants in the 1850s and

later, and from more recent pen and wall building by ranchers (Jackson 1966). The village was inhabited by native Hawaiians and their descendants from ancient times through ca. 1926. Its present configurations of walls and platforms are remnants of its last occupation in the early 1920s when Ki'ilae was one of the last isolated coastal villages surviving.

Archeological base maps were completed in 1968 which show all the major walls and stone structures in Ki'ilae village. As in other regions of the park, cattle, goats, people, and natural forces have broken down walls, house platforms, graves, and temple sites. Stabilization procedures at Ki'ilae village will consist of detail mapping and photographic records to identify structurally weak and broken areas. Preservation treatment (stabilization) will consist of:

- a) Removal of broken areas if they are determined to endanger the structural integrity of the site or create a public safety problem;
- b) Identify, plot, measure, and record, but not disturb, intact areas. A case report in compliance with 36 CFR 800 will be made prior to any action.

Interpretation of this village which represents the transitional life ways of rural Hawaiians acculturating to Western technology may justify, in the future, the reconstruction of selected buildings with thatched walls and corrugated iron roofs. This will depend on a change in Service policy. Preservation through stabilization, repair, and vegetative clearing of the entire village requires land acquisition. Only part of the village is now in the park.

Holua slide. Five such slides are known to the Honaunau region. Three of these lie within the park (figure 3). The one closest to the visitor circulation area was archeologically tested and stabilized in 1968. Preservation through stabilization and repair of all is the management policy. Partial or full restoration of the slide nearest visitors to explain this unique and dangerous sport may need to be done in the future to satisfy interpretive needs.

### Relationship to Other Projects

Master plan boundary changes. Integral to all aspects of the master plan is the proposal to extend the park boundary to include a total of 204 acres of new land and 112 acres of water area (figure 4) for effective management. Added to the existing acreage of 181.85, the resulting total area would be about 534 acres. The proposed addition includes the balance of Ki'ilae village, the upper sections of two holua slides, the north shore of Honaunau village and associated archeological sites, the waters of Honaunau Bay and a narrow strip of water extending from the bay south to the proposed south boundary.



**Fig 4. Boundary Proposal**



Other master plan changes. With the boundary expansion, it is proposed that the present temporary administrative and maintenance facilities that are built adjacent and over historic and prehistoric structures be obliterated and new facilities be constructed in the area of the present sewage treatment plant. Archeological and historical studies in compliance to 36 CFR 800 will precede all proposed projects.

The administration building will house orientation facilities and future visitors will park their cars there and either walk, or ride a shuttle vehicle, to the area of the present visitor center. Most of the present parking slots at the visitor center will be obliterated. Maintenance facilities will consist of an office, shop, garage, and yard.

The sewage lift station that is presently located on the historic palace grounds will be relocated.

The picnic areas, located in front of the present administrative and maintenance facility and in full view of the pu'uhonua to the Ki'ilae village interpretive trail, will be relocated to the area of the present boat launching ramp after boundary expansion. The boat ramp will be maintained at its present level and not expanded.

When offshore waters are acquired, underwater interpretation of Honaunau Bay is proposed. No detailed plans have been made, however.

To protect the archeo-historical and natural resources of the park, boundary fencing will be necessary on the east boundary, after boundary expansion, to keep the neighboring ranchers' cattle out. Grazing animals are now kept out of Ki'ilae village by a temporary fence.

Hawaii Division of Fish and Game. At present, the park boundary extends to the high-water mark and the offshore waters are owned by the State. State jurisdiction of Honaunau waters has not been compatible with Service management of a historical area.

Yachts and other modern boats are permitted to anchor in Honaunau Bay. They encroach on the historic scene, their anchor chains tear up the coral, and garbage and even sewage, at times, are dumped into the bay. The latter is especially bad as there are times when up to sixty children may be swimming in the bay. Many times the boats remain anchored for weeks.

The bay is closely tied in with the reason that Honaunau was originally settled by the Hawaiians-- the canoe landing areas and the rich harvest from the sea. Today, this is being destroyed because of the anchor chains, coral taking, and tropical reef fish taking for salt water tanks by commercial outfits with SCUBA gear. Another situation that has recently arisen is the dumping of an old engine into the bay by a boat owner to which is tied a luminous buoy. The Corps of Engineers is aware of the situation.

State Department of Health. Water quality of Honaunau Bay is regularly monitored by the State Department of Health.

Bishop Museum. A composite natural and cultural history of Honaunau by the Bishop Museum, in preparation for establishment of a national historical park, serves as an authoritative information base for park management. Professional consultation and occasional onsite surveys have been provided to the park on a continuing basis by Bishop Museum.

Cooperative Park Studies Unit (CPSU). CPSU consists of University of Hawaii faculty and graduate assistants, contracted by the National Park Service, to do the research to gather data which park managers need to guide resource decisions. The following research projects will be conducted by the University of Hawaii CPSU specifically for City of Refuge National Historical Park: a survey of Honaunau Bay marine resources and a bioecology atlas of the park which will incorporate existing information and current field observations.

## Environmental Review

The Natural and Cultural Resources Management Plan for City of Refuge National Historical Park proposes an action program to manage the area's resources. Its accompanying environmental assessment analyzes the environmental impacts of the proposed actions and considers alternative actions.

The overall impact of the plan is to maintain a natural environment which resembles conditions of the historic period and to protect the cultural resources in perpetuity. Vegetative clearing will expose archeological sites for observation and interpretation and remove destructive root systems. Archeological work ranges from preservation to stabilization to selective excavation. Stabilization of the Old Heiau site, Alahaka-Keanaee ruins, and Keokea temple ruins will affect original in-place associations; slumping and other structural failures may yield structural information but may also destroy portions of the original facings and fill. Selective excavation of the Old Heiau site will entail the greatest impacts, including irreversible alteration of sub-surface layers and removal of portable artifacts. The degree of treatment for the Old Heiau site is greater than stabilization, but necessary in order to retrieve information prior to natural wave erosion.

For each proposed action, a "no action" alternative was considered. Lack of vegetative management actions would lead to firmly established exotics, such as kiawe and haole koa. Proliferating root systems would continue to break up archeological features. Fuel build-up and fire hazards would threaten cultural resources, structures, and the aesthetic scene. Lack of archeological work would accelerate natural and human-caused erosion of sites. No data recovery would take place prior to loss by natural forces. Other vegetative management alternatives included massive herbicide application--of questionable effectiveness with potential contamination--and prescribed burning--feasible but potentially carrying irretrievable cultural losses. Other archeological alternatives included strict conservation measures--which would not allow data recovery in cases of inevitable losses by natural erosion--and extensive excavation--which would yield much information but destroy sites for future research and irretrievably alter surface and sub-surface remains.

Because none of the proposed actions entail significant environmental impacts, it is recommended that the City of Refuge resources management plan be assigned a negative declaration. Unless significant controversy develops during public review, a full environmental statement will not be prepared.

The resources management planning effort at City of Refuge National Historical Park will be translated into an action program when the 30-day public review period has expired.



## ENVIRONMENTAL ASSESSMENT

### Description of the Environment

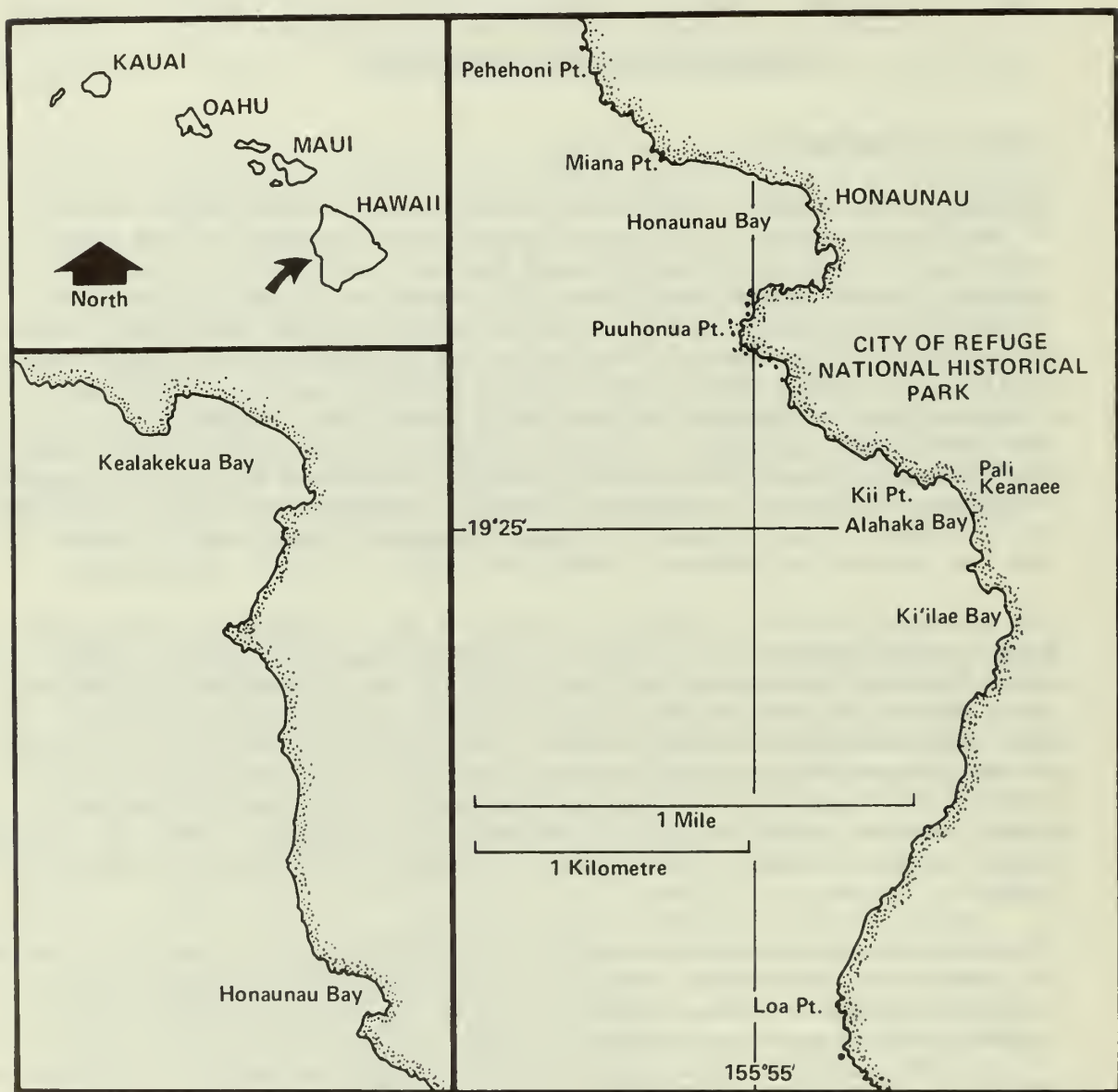
#### NATURAL ENVIRONMENT

Geology. The Island of Hawaii is located at the southeastern end of the Hawaiian chain. It is geologically the youngest of the group (figure 5). City of Refuge National Historical Park lies on the western slope of Mauna Loa (figure 6), where the 13,680-foot volcano passes beneath the sea and flattens out in a westerly direction. For many miles north and south, the west slope of Mauna Loa is a gentle incline of pahoehoe and aa lava flows. It joins at the north with a similar slope of Hualalai volcano which looks like a slight bulge in the coast north of Kailua. The City of Refuge lies on the south shore of Honaunau Bay as a lobate point, some one thousand feet by one thousand feet, composed of a somewhat hummocky pahoehoe lava flow. The flow has a slight seaward slope; its edge is marked by many small inlets and its surface by patches of sand and rubble, in part, man-placed.

The principal physical feature of the park is the small and attractive Honaunau Bay (figure 5). It lies 2.5 miles south of Kealahou Bay where Captain Cook was killed, and north of the old village of Hookena where Robert Louis Stevenson did some of his writing. Most of the park lies below the 30-foot contour. The shoreline is flat. The slope of the land rises gradually from the sea to a fault escarpment, Pali Keanae, which is 120 feet high at its highest point within the park. There is local quake activity connected with this fault. The last serious quake occurred in 1951, razing many buildings in the vicinity of the park.

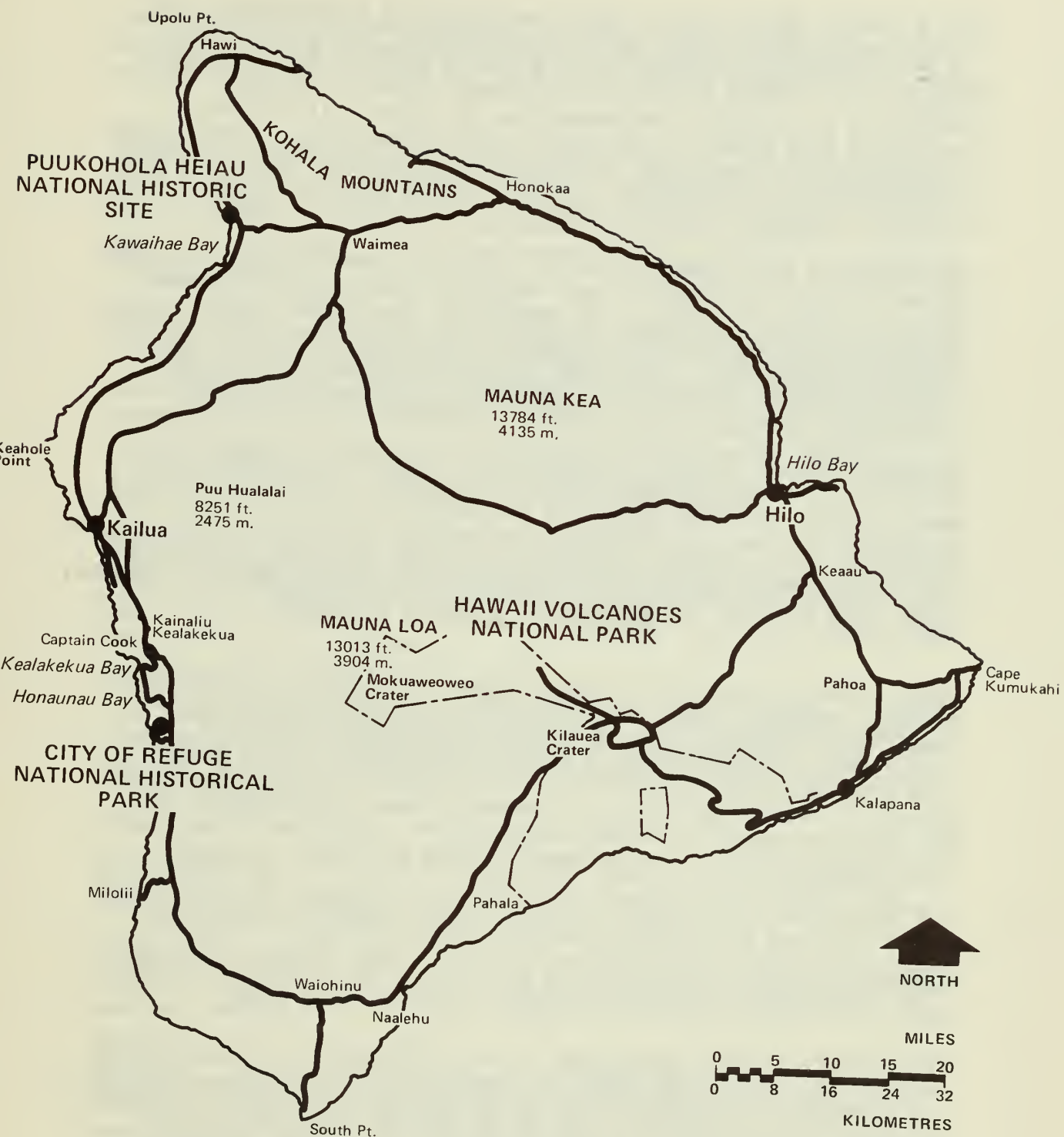
The Honaunau coastal plain on which City of Refuge is situated was formed by prehistoric lava flows from Mauna Loa, followed by a coastal fault subsidence which continues today at a settling rate of one foot per hundred years (Apple and MacDonald 1966). Mauna Loa is still active. In the 1950 eruption, three lava flows descended the western slope of the mountain and entered the ocean. The northernmost of the flows reached the sea seven miles south of Honaunau Bay. The summit eruption of July 1975 sent no lava toward the Kona coast.

At some time in the geologic past, probably some thousands of years ago, the below-sea level section of Mauna Loa and part of the narrow shoreline slipped down in relation to the upper part of the mountain slope. The cliff left standing as a result, Pali Kahalo, forms the head of Ki'ilae Bay and Kauhako Bay at Hookena. Similar remains can be found parallel to the shore in a number of discontinuous alcoves with cliffs at the landward side for a distance of about 15 miles southward.



**Fig 5. Location Map**





**Fig 6. Island of Hawaii**

Two principal fault systems affect the area near Honaunau Bay. The Kaholo fault system lies close to the shoreline from a point just south of Honaunau southward for 15 miles or more, to the vicinity of Milolii. This fault has produced a seaward-facing cliff that lies one-fourth to one-half mile inland from the shore. It has been mantled by lava flows from the upper slope of Mauna Loa. The cascades and draperies of lava along the buried fault scarp are well displayed just south of City of Refuge. The park itself lies on a coastal flat built by a pahoehoe lava flow that spread out below the scarp.

The faults of the Kealakekua system extend southeastward from the head of the bay for about three miles, then bend southward and disappear beneath younger lava flows. The abnormally steep slope indicates that the faults probably continue southward beneath the lava cover for at least four miles more. Lava flows moving downslope over the fault scarp have spread out beyond it forming the broad, gently sloping apron that borders the coast between Kealakekua Bay and Honaunau.

The only historic eruption within the area took place beneath the ocean in 1877. At that time steam and fragments of lava rose along a west-northwest-trending fissure in Kealakekua Bay and for a mile or so farther out to sea. A continuation of the crack is said to have extended inland nearly three miles, and clouds of steam and smoke issued from the fissure either in that area or farther up the mountainside (Westervelt 1916). The eruption was preceded by a severe earthquake.

Soils. The soils of the Kona slopes have been derived from basaltic volcanic products. They owe their differences chiefly to rainfall, temperature, drainage, vegetation, and age. Where temperature is sufficiently high and rainfall sufficiently heavy, soil is produced by a process called laterization. The resulting latosols are derived chiefly by removal of bases and combined silica through weathering. The amount of humus in the soil depends upon the nature of the vegetation which grows on the soil, again related to climatic conditions.

The bulk of the Kona slope, at least in the vicinity of Honaunau, has soil classified as a type of lithosol called rockland. This soil consists of a very thin covering of volcanic ash on young, relatively smooth and unbroken pahoehoe. In most places the soil layer is about four to six inches thick, seldom more than ten inches deep.

The majority of the park terrain is bare pahoehoe lava. It is exceedingly rough with billows, pockets, cracks, and loose rocks. The north end of the palace grounds is grassy and the two nearby coves are sandy. These and other pockets of sandy areas from the south end of the pu'uhonua to Keawe's house site consist of a mixture of coarse and fine black, white, brown, and grey particles. The major sand constituents are basalt, olivine, and calcium carbonate particles.

There is very little soil within the park. The soil present consists of accumulations of weathered lava bits, material from the sea and vegetal debris in pockets and depressions in the pahoehoe lava terrain.

Climate. Kona mornings are usually clear and cool breezes begin to blow onshore by mid-morning. In the early afternoon clouds begin to form at 2,000 feet, causing precipitation at higher elevations. In the evenings the winds begin to cease and clouds disappear. Cool night air flows down the mountain slopes and across the coastal area toward the sea.

There is little variation in temperature from month to month. The average annual maximum is 88 degrees and the minimum is 65 degrees; the day and night difference is 20 degrees. In the summer there are occasional uncomfortable warm days when humidity is high and air movement is minimal. Rainfall near the coast is low, but remains rather uniform at about two inches per month throughout the year; the annual average is 20 inches. The maximum rate of fall is an inch an hour, but there are rare periods of prolonged showers.

Storms move through the area more frequently from December through February bringing high winds and severe rains from the west and south. These are termed Kona storms, and during such periods high seas and winds create conditions sufficiently hazardous to justify closing the park shoreline to visitors.

Tsunamis (tidal waves) occur infrequently on the Kona coast. There were three major tidal waves in the 1800s. Since much of the park is below the 50-foot elevation, a special tsunami warning system has been installed by the park in cooperation with the County Civil Defense Department.

Water resources. The park headquarters, located at the northern end of the park, is supplied by water from a nearby county supply. This supply appears to be more than adequate at present.

No perennial streams flow in the park; however, one intermittent stream of moderate size drainage crosses the park and into the ocean in the southern portion.

The availability of ground water in the Hawaiian Islands is uniquely unpredictable due to the geohydrologic conditions which exist. The islands are volcanic in nature and as such, are highly subject to intense fracturing through continued eruptive stages. These fractures often affect and control the local hydrologic conditions; i.e., the intense fracturing may result in ground water drainage of overlying sediments--the presence, thickness, and permeability factors of which may vary greatly. The volcanic rocks themselves are generally quite porous, but the pores are rarely interconnected, thus these rocks have



very low permeabilities. Any ground water that is available in the park would be derived from the east, the ground water gradient sloping to the west. Such ground waters, when present, may exist under varying hydrologic status, e.g., perched artesian. These waters would discharge into the ocean at an undetermined rate and depth. Future development of the park, or private development along the park periphery, may require the utilization of ground water sources. Such development could result in an overdraft from the fresh water source, resulting in salt water intrusion into the aquifer.

Maintenance of high water quality at Honaunau Bay is an important resource management objective which embodies the perpetuation of native biota and the aesthetic value of clear waters. A new sewage treatment plant was constructed in 1971 and extensive herbicide application has been discontinued; thusly, two identified sources of contamination (Doty 1969) have been remedied. Water quality has markedly improved at Keone-ele cove, which attracts several thousand swimmers annually. Honaunau Bay presently meets State standards for a swimming beach. There are turbid places in the bay, believed to be caused by the upwelling of colder fresh water. The density differential causes a cloudy appearance in a few isolated locations.

## Terrestrial Life

Plants. The shoreline vegetation of Honaunau Bay is predominately xerophytic scrub with some trees. In ancient times the area above the park (Bryan 1957) was largely barren lava with pili grass (Heteropogon contortus) common in soil pockets. Pili grass was widely used for thatching houses. Near shoreline grew shady groves of coconut (Cocos nucifera), hala (Pandanus spp.) kou (Cordia subcordata), and ti, originally called ki, (Cordyline terminalis). Noni (Morinda citrifolia), a medicinal plant, still grows here. It is estimated that much of the old village of Honaunau was along the northern shore of the bay, and within the mixed opiuma/ekoa forest are scattered remnants of cultivated plants. These include noni, tamarind (Tamarindus indicus), and breadfruit (Artocarpus altilis). Opiuma has been largely replaced here by kiawe.

From 1962 to 1963, the park undertook to clear the exotic vegetation on the mauka (mountain) side. The goal was restoration of the lava landscape to its original barren state. Since then, restoration of native plants has been confined to coconut trees. The oldest stand within the park was planted in 1904 by Reverend Paris; however, many of these trees are now old and present a hazard, so they are being replaced on an individual basis by young specimens. Additional coconut trees were planted by the park in 1961, 1962, 1964, 1973, and 1974. Some pili grass has been reintroduced. Ten fan palms were also planted but none survived; a more recent planting of nine palms appears to be successful.

At the present time weedy vegetation again dominates. The area is an ekoa (Leucanena leucocephala) thicket with species in abundance typical of the surrounding, uncleared opiuma/ekoa scrub forest. Common plants are hialoa, passion flower, morning glory, sword fern, garden spurge, Madagascar periwinkle, and klu. The grass present is mostly red top (Rhynchelytrum repens), an introduced forage species.

Shoreline trees at City of Refuge include coconut, noni, hala, and kou. The sedge Fimbristylis cymosa grows in pockets in the pahoe-hoe lava close to the sea and another sedge, 'ahu'awa (Cyperus sp.), grows around the brackish pools near the Great Wall. These plants are native or were introduced by the Polynesians, and were undoubtedly growing here when the pu'uhonua was historically used. Weeds are periodically eradicated. The dominant grass is Bermuda grass (Cynodon dactylon). The park grounds are presently an approximate re-creation of the pre-European scene, but the general surrounding conditions of thorny introduced scrub requires an active hand at exotic control and native reestablishment.

Animals. Shore birds that frequent the Honaunau region are the kolea or Pacific golden plover (Pluvialis dominica), akekeke or ruddy turnstone (Arenaria interpres), and in less abundance, ulili or wandering tattler (Heteroscelus incanus). Pu'ueo or Hawaiian owl and koloa or Hawaiian duck are sometimes seen. Common introduced birds are the piha-'ekelo or mynah, 'ehako or turtle dove or Chinese dove, barred dove, red cardinal, house finch, and white eye. A few night herons have been recently seen. Birds of former distribution on the Island of Hawaii and presently of endangered status are the io or Hawaiian hawk (Buteo solitarius), alala or Hawaiian crow (Corvus tropicus), akepa or Hawaii akepa (Loxops coccinea coccinea), and ou (Psittirostra psittacea).

The only native mammal in the Hawaiian Islands and occasionally sighted in the park is the Hawaiian hoary bat (Lasiurus cinereus semotus), recognized as an endangered species. The most common mammal in the park is the mongoose (Herpestes griseus), introduced in 1883 to destroy rats but, instead of which, seriously decimated groundnesting birds and their eggs. Rats still abound, including the house mouse, white-bellied or Alexandrine rat, black rat, and brown or Norway or wharf rat. One variety of rat was of aboriginal introduction; it is called Rattus hawaiiensis Stone. The Hawaiians made a sport of shooting rats and mice using bow and arrow, the only way they made use of this type of weapon.

Of a total 609 insect species recorded for the Kona district, only 150 species have been collected in the park area, and of these, 72 are considered native to the islands. With the disappearance of native plants, along went many of the endemic insects that were associated with them (Suehiro 1957). One species in particular, the abundant and widespread ant, Pheidole megacophala, has caused the destruction of countless endemic species, especially beetles. The little silk-spinning embiid has been sighted in the park and is common in the drier lowlands.

Surprisingly, all the species of leafhoppers collected in the park area are endemic; they were collected on native plants such as Straussia, Myoporum, and Maba and must have occurred in the lower forests back of Honaunau. Only one species of the many native damselflies has been collected at Honaunau; this species is common and often found from sea level to the native forest, breeding in streams and forest pools. Except for an endemic species of wood borer, all 23 species of beetles from the park area are immigrants. Most of the other insects found in the park area are pest species or species historically introduced for biological control. Cockroaches, flies, and termites thrive in the warm, humid climate. The familiar honey bee is commonly seen and the immigrant bean butterfly has been collected at Honaunau.

Commonly found reptiles include three species of geckos and three species of skinks. Geckos are active at night, usually seen in houses or on screens catching insects which are attracted to lights. Skinks are active in the day, commonly seen sunning themselves or darting in search of insects in the open or from under rocks and loose piles of litter.

#### Marine Life

A complex of bays and inlets south of Miana Point (figure 5) harbors a colorful range of Hawaiian animal and plant life. Plankton, abundant near the water surface, is one indication of Honaunau Bay's high productivity. Visible algae is almost entirely intertidal; benthic seaweed populations are sparse. A single red alga, Tolypiocladia glomerata, is generally observed at depths greater than two meters, and the substratum of Keone-ele cove is blanketed by another red alga, Gelidium sp., which is likewise the only contaminated area in Honaunau Bay. The coral population present is unique to this area: Pocillopora meandrina is found to a depth of five meters, castle coral (Porites pukoensis) extend to a depth of 15 meters, and finger coral extends to a depth of 20 meters, usually found in sheltered and deeper waters. A noteworthy balance of gastropods, like cowries and cones, and bivalves, like clams and oysters, exists in Honaunau and Kealakekua Bays. Bivalves are filter feeders and hence tend to increase when pollution increases, whereas gastropod populations are indicative of unsilted conditions; these molluscan fauna are a standout in clear waters. Echinometra mathaei is the most abundant urchin in Honaunau Bay and the uncommon slate pencil urchin, Heterocentrotus, takes an important place in overall biomass. Slate pencil urchins are found in Kealakekua Bay as well as the wana or sea urchins, Echinothrix, Echinometra, and Tripneustes. The abundance and distribution of Echinometra oblonga and E. mathaei are similar in Kealakekua and Honaunau Bays. The only larger crustacean seen in numbers is the cleaning shrimp, Stenopus hispidus. The population of spiny lobsters (Panulirus japonicus) in Honaunau Bay is scant, apparently due to human foraging. Kona crabs (Ranina serrata) are commonly trapped at sand depths of 60 meters off Alahaka Bay. One hundred and twenty-one species of fishes have been observed in Honaunau and Kealakekua Bays. The most common fishes are yellow tang



(Zebrasoma flavescens) and kole (Ctenochaetus strigosus). Distribution closely reflects adaptation to ecological niches and therefore shows the importance of maintaining a high quality environment. Kole is a common fish throughout the islands whereas Hawaiian kole (C. hawaiiensis) is common in Honaunau Bay, but uncommon in most other areas of the Hawaiian Islands. These species live between boulders and coral mounds and feed on microorganisms. Just why the latter is common here is not known.

The fringing coastline of Honaunau Bay presents a more or less constant topography and a varied distribution of marine life. Of immediate concern is the quality of tidepools in front of the pu'uhonua, or place or refuge. A lava flow extends about 500 feet from the shore seaward, studded with small pits, crevices, and shallow basins which is easily accessible to visitors and presents a showcase of periwinkle, crabs, algae, sponges, urchins, and brightly colored sea anemones. Significant marine vertebrates sighted in the vicinity of Honaunau include sharks, porpoises, turtles, and whales. Sharks frequent larger Kealakekua Bay and the exposed bays to the south, Alahaka and Ki'ilae; species include Caracharhinus milberti, C. galapagensis, C. limbatus, and Galeocerdo cuvieri. Residents tell of times when Honaunau Bay was used as a dumping ground for fish market refuse and attracted sharks and ulua (Caranx spp.) as if on schedule. There is a resident school of spinner porpoises (Stenella sp.) in Kealakekua Bay. From 30 to 80 members are variously estimated and the animals are quite tame. Fishermen say they roam a wide section of the Kona coast but always raise their young in Kealakekua Bay. A small school of pilot whales was once sighted swimming north of Honaunau Bay. Fishermen say they are common in winter with the offshore current southerly and strong, leaving in spring as the current slows and turns northwest.

## CULTURAL ENVIRONMENT

### Archeology and History

In aboriginal societies, the death penalty for individual wrongdoing and extermination in times of war were not unusual practices. In this respect, the Hawaiian society was no exception. The concept of asylum, for the innocent and guilty alike, was a unique one common to ancient Polynesia, and especially refined in the Hawaiian Islands (Kelly 1957). The Island of Hawaii was divided into six chiefdoms and their names are still used today to denote districts: Kona, Kau, Puna, Hilo, Hamakua, and Kohala. Circa 1475, a king named Liloa had been able to join all six chiefdoms under his power. When Liloa died, he left six sons and each was given a chiefdom. Each lesser high chief inherited from his father the right and obligation to grant mercy. Each one set aside a pu'uhonua or place of refuge, and City of Refuge National Historical Park is the site of one such pu'uhonua in the Kona chiefdom.

Reverend William Ellis, in his 1823 Tour of Hawaii publication, termed the pu'uhonua grounds as a city of refuge, likening it to Old Testament cities of refuge. It is important, therefore, to distinguish the biblical institution of the Israelites from the Hawaiian pu'uhonua, which translates more exactly as "place of refuge." Reverend Ellis was a missionary and an ethnographer who could speak the Hawaiian language. Despite the misnomer which persists today, Reverend Ellis was the first westerner to capture and record the significance of the place.

The pu'uhonua (figure 1) was comprised of a pahu kapu (sacred enclosure) of considerable extent, adjoining the Hale-o-Keawe southward. These pu'uhonua afforded an inviolable sanctuary to a fugitive. Several wide entrances near the sea and facing the mountains were always open to admit the manslayer, kapu breaker, thief, and even murderer, although the fugitive was often pursued even to the gates of the enclosure. Whenever war was proclaimed, a white flag was unfurled on top of a tall spear until the conclusion of peace. Those women who did not accompany their men to battle, children, and old people temporarily resided in the pu'uhonua during these times. Warriors, in pursuit of the vanquished, had to fall back at the white flag marker, or else they were immediately killed by the attending kahuna (priests).

The pu'uhonua usually operated in conjunction with a heiau or temple, whose deities extended their protecting influence over it. The kahuna also watched over the pu'uhonua. At Honaunau the heiau was a neatly thatched house with a high roof, surrounded by an array of grimacing images standing on a pavement at the north end of the great wall of the enclosure (Emory 1957). This heiau was called Hale-o-Keawe (figure 1) or Ka-iki-'Alealea, which translates as the House of Keawe or the Little 'Alealea. 'Alealea is the name of a larger and earlier heiau whose high stone platform dominates the interior of the pu'uhonua, and dates back to at least 1125 A.D. Keawe-i-kekahi-ali'i-o-ka-moku is the name of the Hawaiian king whose bones were placed in the Ka-iki-'Alealea after his death.

The largest single structure within the park is this Great Wall (figure 1). It was reconstructed by W.A. Wall in 1902 when the area of the present park was Bishop Estate land. After 61 years of neglect portions of the wall in bad state of disrepair were stabilized by the National Park Service. The seaward ends were investigated by Bishop Museum archeologists in 1919.

It is assumed that the stones used for the wall were brought from the nearby area. Since the Hawaiians had neither wheels nor beasts of burden, it is also assumed that rocks were carried, rolled, or pried along with levers. The stones were fitted and placed in such a way that they formed a smooth flat surface (face) at each edge of the wall. The center portion, between the two faces, was rubble fill. In some places a vaulted construction (pao) was used probably to cut down the amount of fill needed. Mortar was not used in the wall; it was held together by gravity and friction. People, goats, earth tremors,



and high seas have eroded and shortened the wall from 1,000 feet to its present 978-foot length (Vaughn 1968).

According to genealogical accounts collected by Bishop Museum, the wall was built about 1600 A.D. The reason for building the wall is still conjecture. If a likely explanation is found, it will probably have something to do with the fact that the wall marks the boundary of the refuge area and separates it from the adjacent palace grounds. The wall is L-shaped, forming the south and east boundaries of the place of refuge, and the sea outlines the other sides.

The old Honaunau village was located on the northern shore and head of the bay. Ellis counted 147 houses there in 1823 and not less than 40 villages extending further north of Honaunau along the coast to Kailua, 22 miles away.

Two house sites have been identified as chief's residences in the park--chief's house site and Keawe's house site. The chief's house site was excavated in 1968. It is composed of several contiguous platforms on which were the separate eating and sleeping houses for men and women, as well as the cooking house. Excavations revealed that the site was occupied from prehistoric to modern times. Keawe's house site consists of several contiguous stone platforms with a low wall surrounding the entire ruin. Associated with the site is a fishermen's ku'ula (shrine) and the coastal trail runs between the site and the ocean. Evidence of later uses in the form of discarded shells from opihi (limpets) are found scattered over the site. A number of kings, high chiefs, their staff members, and women lived on the palace grounds (figure 1) on choice beach front, located today in the grove of coconut trees. Commoners apparently did not have extensive dwelling units.

The chiefly seat of power shifted from Honaunau to Kailua in Kona, Hawaii, to Maui, and then to Honolulu, Oahu, as ships, traders, and missionaries converged upon these ports. The resultant changes were to rob Honaunau of the exalted position it had enjoyed from the time of the establishment of its Hale-o-Keawe down to the death of Kalaniopu'u in 1782. Kalaniopu'u's body lay at Honaunau while the events were shaping which would raise his nephew, Kamehameha, to the kingship of all Hawaii, in place of his son, Kiwala'o. Ka-'o-lei-o-ku, who was sired in Kamehameha's youth, was the last chief to have his bones deposited in the Hale-o-Keawe. That was in 1818. The following year, Kamehameha's son and heir, Liholiho, abolished the kapu of the gods and Hale-o-Keawe was no longer regarded as a sacred temple of the pu'uhonua.

Since the establishment of the park in 1961, most efforts in restoring the historical scene have been in the area of and surrounding the pu'uhonua. The Great Wall, which forms the inland boundary of the pu'uhonua, was stabilized, and selected portions restored. The 'Alealea heiau within the pu'uhonua was restored and the platform of the Hale-o-Keawe heiau was restored and the temple and images reconstructed. The

project to reconstruct the Hale-o-Keawe at the seaward end of the Great Wall involved not only the park staff, but the support and contributions of the citizens of Hawaii. Concerned individuals and groups contributed ti leaves to be used in the thatching of the restored structure.

Federal status and protection. The City of Refuge National Historical Park was authorized on July 26, 1955 as a unit of the National Park System, and the park boundaries coincide with the property boundaries on the National Register of Historic Places. The site is of national significance and was recorded in the National Survey of Historic Sites and Buildings in 1962. This survey recorded a total of 321 archeological and historical features and the following 15 features were separately nominated to the national register:

- Hale-o-Keawe or House of Keawe
- Pa pu'uhonua or Great Wall
- 'Alealea Heiau
- Ancient Heiau
- Chief's House Site
- Keawe's House Site
- 'Oma'o Heiau
- Keanaee Heiau
- Honaunau Holua
- Keokea Holua
- Ki'ilae Holua
- Alahaka Ramp
- 1871 Trail
- Ki'ilae Village
- Keanaee Shelters

The above features have been included in the list of classified structures of the National Park Service and recent estimates for stabilization and preservation costs have been made. As a property on the National Register of Historic Places, all proposed undertakings of the National Park Service within City of Refuge National Historical Park require compliance with Section 106 of the National Historic Preservation Act of 1966, Public Law 89-665.

Traditional and historical human use. The first Hawaiians brought with them some plants and animals they needed and which they could not be sure of finding in a new land. Taro and the sweet potato were among those brought for food; and wauke (paper mulberry) was carried along to produce the bark needed for making kapa (bark cloth).

Intentionally, the Hawaiians introduced the pig, the dog, and the jungle fowl. They inadvertently brought along the rat, mouse, skink, and gecko. A bat was the only land mammal native to Hawaii. Captain

Cook introduced goats in 1779. Vancouver brought sheep and cattle in 1794, and horses were introduced in 1803. The forage animals, especially the goat, browsed far and wide. In some areas, overgrazing led to a denudation of slopes followed by an increased aridity of the soil. Places where Hawaiians once farmed are now too dry to farm.

A corollary to the destruction by grazing of the native vegetation was a need for new food sources for livestock. Feed was shipped in, enabling some of the exotic forage plants to establish themselves, along with some grasses which came along in seed form. Rooting by pigs and grazing animals disturbed the native vegetation, enabling the exotics to become firmly established. A greater alteration of the landscape occurred when ranchers began growing certain kinds of trees to serve as forage for cattle. Kiawe, opiuma, and ekoa were spread in this fashion. This invasion of Kona lowlands is fairly recent. Aerial photographs taken in the 1920s show the same areas as barren, with occasional sections of grassland.

Fish hooks were made from a dog's tooth or a scrap of pig or human bone. The tools for turning a blank into a finished hook were readily available. Coral, sea urchin spines, and the lava underfoot provided files, saws, reamers, and drills for every need. Tidepools provided food in abundance. The people of Kona were famous for their crab-catching methods, and there were five kinds of sea urchins, eels, several varieties of small fish, and a number of shellfish. Important among the shellfish were the black pipipi, limpets, and several species each of cone and cowry shells. The meats were eaten raw with a little limu (seaweed) and salt crystals from evaporated sea water for condiments.

Fishponds were built near the ocean as holding basins for fish cultivation. There were kapu (taboos) prescribing certain choice fishes only for royalty and barring women from eating certain fishes. The royal fishponds at City of Refuge lie just south of the coconut grove. The water in them rises and falls with the tide. These kaloko (ponds) have been partially silted with mud and contain exotic fishes, such as Tilapia.

Present human use. Since 1961, visitation has risen sharply from 37,700 to 391,700 in 1973, and this upward trend is expected to continue. Visitation is entirely day use except for night fishing by local citizens. The heaviest period of use is usually mid-day and the pattern is generally an orientation talk, a tour of the palace grounds, demonstrations of traditional Hawaiian activities, a visit to the Hale-o-Keawe, and to the place of refuge. The park is a major tourist stop situated only three miles from the Kona belt road. The Kona belt road is the route of most cross-island tours between Hilo and Kona. Visitors driving rental cars follow patterns similar to those in tour buses.



Present human use at the park is typically touring, picnicking, swimming, fishing, and boating. Keone-ele cove is a popular wading and swimming spot. The pressures of specimen collecting, especially tropical fish, coral and seashells, have not yet been gauged. There have been some problems with sailboats that anchor in the bay for weeks at a time. The anchor chains tear the coral, and garbage and sewage are dumped into the sea.

Modern outrigger fishing canoes are stored on the beach of Kapuwai cove. Opelu (Decapterus pinnulatus) is caught offshore by line at night or netted by day from outriggers. Pole fishing along the shore is popular. Surrounding cross nets and throw nets are also occasionally used in Honaunau Bay. In surrounding cross-netting, a net is stretched across a section of the bay and swimmers chase the fish toward it; as the fish approach the net, the ends are brought together, surrounding the fish. In another type of fishing, fish are speared by divers.

Opihi (Cellana spp.), pipipi (Nerita spp.), and a'ama (a crab, Grapsus grapsus) are also collected along the shoreline and in tidepools. Wana (Centrechinus paucispinus) are collected seasonally for their edible gonads. Lobsters are scarce and found only by knowledgeable divers. As long as the products gathered from the sea and from the shore and inshore waters are naturally replenished, traditional practices by the local rural population will be permitted to continue without closing of areas, regulating the number of catches, or stopping the collection of any species of plants or animals.

Surrounding land use. Land use on the Island of Hawaii is in a state of change. The island was predominantly agriculture oriented. However, with rising labor costs and land values, there has been a gradual shift toward land development for the visitor industry and retirement or second-home communities. At the present time, most of the land surrounding the park is owned by the Bishop Estate and the McCandless Ranch and is used for the grazing of livestock.

The chief industry on the island is still the production of sugar, although tourism, grazing, diversified agriculture, and floriculture are also important to the economy. In addition, coffee, macadamia nut, plumeria, papaya, and avocado are grown on the Kona coast above City of Refuge at an elevation of around one thousand feet.

Resort development is concentrated in two areas, Hilo (figure 6) on the windward side and the Kona coast on the dry leeward coast. Most existing facilities in Kona lie north of Honaunau near Kailua (figure 6), but recent construction and future plans indicate considerable expansion north of Kailua toward Kawaihae, and south toward Kealahou and Honaunau. The latter area is in the immediate vicinity of City of Refuge, an area previously isolated from modern development. It should be noted, however, that recent economic trends seem to indicate a possible change in the demand for hotel rooms. A major study conducted by the State noted that the visitor industry may be

overextending itself and by 1975, the Kona area could be overbuilt by as much as 2,300 rooms (State of Hawaii 1972).

Current land use surrounding City of Refuge has the potential for change. In historic times, the entire Kona coast, including the vicinity between Kealahou and Kauhaleo Bays, was dotted with Hawaiian settlements. European contact and importation of laborers from the Far East in the latter part of the nineteenth century stimulated a move to the coffee belt lying along the mountain slopes above the coast. As a result, the Honaunau Bay area north of the park is inhabited by a few families who lease their land from the Bishop Estate, in addition to those who own their own land. The last decade has seen a dramatic growth in tourist facilities in Kona, although thus far, it has not progressed south of Kealahou Bay. The future, however, suggests possible development on these coastal lands, including hotels, vacation homes, and all the attendant roads, shops, restaurants, utilities, and other facilities. Because plans are as yet indefinite, the extent of future development is not known. Moreover, the recent economic trends and the spectre of possible overdevelopment in Kona create some questions about the future of expanded development in this region. But even with this recent change in the economic picture, it is still likely that land around City of Refuge, which is now open space, will someday support developments similar to that between Kealahou Bay and Kailua.

#### PROBABLE FUTURE ENVIRONMENT WITHOUT THE PROPOSED PLAN

Without the proposed plan, the City of Refuge environment will eventually revert to conditions prior to park establishment--rapidly spreading exotic scrub forest and gradually eroding archeological remains. Although the park will be open to the public and protected as a national register property, it will become less differentiated from its surrounding environment. The serene, open spaces of the pu'u honua and palace grounds will lose more and more buffer ground to the effects of grazing and unattended scrub forest and there will be inadequate visitor and maintenance facilities. The detached parcel will be overgrown with exotics, as it presently exists, and the potential benefits of a native plant nursery will be forfeited. Increasing visitor use will hasten erosive processes of archeological sites; portable artifacts will remain unprotected from high seas and vandalism. Lack of archeological research will limit the information on which management decisions are based. Historical features, such as the chief's house complex, will not be stabilized for visitor interpretation.

Land use and management on the Kona coast indicate trends toward spread of exotics, grazing and commercial crops, and tourist trade development. The traditional village of Honaunau is inhabited by a few families who continue to live in a rural setting. And within Honaunau lies the only enclave of non-commercial native Hawaiian culture, the City of Refuge, open to the public and protected by law. An active hand at maintaining the natural environment and restoring the historic scene is required to insure perpetuation of this unique place within the confines of a rapidly changing island.

## Environmental Impact of the Proposed Plan

### MAINTAINING THE NATURAL ENVIRONMENT

The grounds of the pu'uhonua and vicinity have been largely cleared of thorny introduced scrub, but surrounding areas require an active hand at exotic plant removal. Vegetative management at City of Refuge is designed to maintain the natural scene which existed when the pu'uhonua was in use, except at Ki'ilae village which was inhabited until 1926. Such active management will directly affect the park scene. The primary effect of vegetative management will be on the park's extensive archeological features. Vegetation, largely exotic, has invaded such areas as the Alahaka-Keanae ruins. Root systems eventually become firmly established in cracks and can further break down archeological fabric. It is, therefore, desirable to manually remove invading vegetation among the ruins to slow down natural deterioration and to restore an originally barren state. Major species to be affected are kiawe, opiuma, and haole koa-- these will be removed and, in some instances, replaced with native species such as hala, kou, or pili grass. The overall well-being of the coconut grove will be maintained by replacing individual senescent members with sprouting coconuts. The immediate hazard of tree failure will be removed.

Brush clearing will include temporary adverse effects on the visitor. There will be intermittent, displeasing noise from the chainsaw and chipping operation. There will be minimal ground disturbance since all vegetation will be cut at ground level, or as close to the surface as possible, and left to gradually decline. Archeological features will no longer be obscured and fuel reduction will significantly improve fire protection.

The more substantial clearing and cultivation on the 3.7-acre detached parcel will result in a radical alteration of its present state. Christmasberry, haole koa, lantana, and other introduced species will no longer dominate the scene. This action, combined with active cultivation, will directly affect the subject parcel. An environmental appraisal is on file at the park.

The cumulative, long-lasting effects of vegetative management lie in the integrity of the park scene. Visitors will enter an environment of the historical past-- open beachfront, a thriving coconut grove on palace grounds, pili grass and pili grass huts, and other exemplary native Hawaiian species. Although the park does not encompass a sufficient land base for wildlife management, the park and Honaunau Bay will be further enhanced as an enclave for various birds and fishes.



## RESTORING THE HISTORIC SCENE

Impacts on the cultural resources from the proposed actions, which include repair, emergency and basic stabilization, and where justified, excavation, will have varying degrees of impacts. The proposed excavations at the Old Heiau site-- now 80 per cent destroyed by natural forces-- will destroy in-situ associations and will expose the site to natural and visitor erosion. Test trenching in the beach near the heiau site will destroy about 5 per cent of the site. Removal of scattered stones from the site and tidepools may affect the wave patterns during high seas. Brush clearing around the site has two main effects on the cultural resources:

- a) It removes the destructive forces of the root system and wind-downed trees from the fragile sites and,
- b) It exposes the sites to visitor impacts and removal of large trees, causing root systems to decay, and may cause walls to slump. Proposed trails to Keanaee and Ki'ilae expose, or make available, more sites to visitor impacts.

In compliance with 36 CFR 800, stabilization and archeological study of Hawaiian stacked-stone structures will require individual determinations of effect. Any action, stabilization (repair), or comprehensive stabilization, leads to loss of original associations of phenomena; that is, archeological work that entails taking down a structural failure, investigating the footings for structural information, and recovering portable artifacts destroys portions of the original facings, fill, and sub-surface layers.

Old Heiau site. Removal of rubble from the walls and clearing around the exposed walls, platforms, pavements, and terraces will change the general configuration of the mound as it exists. It will disturb the original in-place association of the fallen building stones and the buried structural features over the entire site. Clearing of scattered (moved by the ocean) building stones now in the tide pools along the northwest side, between the Old Heiau site and 'Alealea heiau, might change the wave and surface action of the annual high seas. The wave patterns are gradually changing due to the sinking coastline.

The condition of the remaining 20 per cent buried in the ground is unknown. A detailed preservation/stabilization plan cannot be made. However, from previous experience, the same general methods used to stabilize the Great Wall will probably be employed; the walls and other features that are sound will not be disturbed. Weak or broken areas will be taken down and re-stacked with minor modifications of the interior fill of the walls. Sub-surface soil deposits, under only the weak or broken portions, will be investigated for portable artifacts and construction of a sound base for stabilization; these actions will destroy the in-place association of any portable artifacts within the site.

The wave and surface action is washing away the remaining 20 per cent of the site little by little, destroying structural data and artifacts important to the understanding of function and time associated with the pu'uhonua. The removal of rubble, recording of structural data, and recovery of portable artifacts would expose more of the structure to natural forces and may accelerate destruction. The loss now is slow, as compared to this action, but will continue with no gain of information about the site. Any preventive measures to stop the ocean's wave action, in view of the sinking coastline, would be futile.

Test trenching in the high-water formed beach will destroy about 5 per cent of the in-place association.

Alahaka-Keanaee ruins stabilization. Vegetative clearing, particularly the removal of large exotic trees and shrubs, may cause the walls and platforms to slump. If allowed to grow and fall naturally, they will cause much more damage.

Clearing rubble from structural failures and fallen building stones will destroy the original in-place association.

Sub-surface investigations for footings and recovery of portable artifacts will destroy in-place association of artifacts and the site. This activity will be limited to broken and structurally weak areas.

Keokea temple ruins stabilization. Vegetative clearing will expose the sites to visitor impacts. Removal of large exotic trees and shrubs growing on, in, and near the site may cause wall to slump.

Removal of fallen building stones from the base of the walls will disturb the original in-place association and expose new surfaces for natural and visitor impacts.

Sub-surface investigations for footings and recovery of portable artifacts will destroy in-place associations. These investigations will be limited to identified weak or broken areas.

Selective sub-surface investigation of all proposed actions for stabilization comprises an irretrievable loss of original in-place



association of artifacts, structures, and site. This loss, however, will be limited to areas of structural failure which must be identified prior to any action.

Sewage lift station. The removal of the sewage lift station from the palace grounds will leave a gaping hole that will need to be re-filled. There will be some muddying of the water in Kapuwai cove if some of the dirt from the project spills into the cove that is right next to it. The site to which the sewage lift station is to be relocated will need to be excavated to a depth of about twelve feet in order to place the underground portions. This means removal of rocks and stones. Some native plants and exotics will need to be removed initially. New piping will need to be laid underground from the new location to the sewage treatment plant.

The long-term effect of cultural resource management actions will be maximum preservation with minimum alteration. Any form of alteration will be preceded by optimal data recovery. Plan actions will result in archeological sites free of destructive root systems, open to interpretation, and where necessary, stabilized or reinforced rock bases. Highly selective research excavation will provide information on site context and significance before it is consumed by natural ocean erosion. Portable artifacts, which would otherwise be lost to the tides and visitor pressure, will be professionally recorded and removed to a collection. Relocation or modification of human emplacements, such as the sewage treatment plant and lift station, will enhance the historic scene; these actions will take place within the larger master plan development scheme.

#### Mitigating Measures Included in the Proposed Plan

Herbicides will be used only by trained personnel using biodegradable chemicals approved by the Department of the Interior. Individual stump application will precede broadcast application whenever possible.

In the course of stabilization work it may become necessary to disturb human burials. Every effort is made to consult the local community prior to any action in which burials might be encountered. A burial will be removed only as a last resort. (On November 4, 1966, a cave in Keanaee Cliffs was dedicated for re-burial of human remains removed from the construction of visitor facilities and stabilization activities in the park. This was done at the request of the local community to insure that these and all future recovered remains stay at Honaunau and not be shipped off the island and, to insure that the burials are treated with dignity and respect.)

Archeological base maps will guide all vegetative clearing operations to insure protection of known archeological surface remains. If, during vegetative clearing operations, there are any new or questionable archeological features found, work will cease until the area is inspected and documented by a professional archeologist. The Pacific Archeologist will:

- a) Change the project to avoid adverse impacts, or,
- b) Provide direction for mitigation of unavoidable impacts.

In the course of preservation work, a scientific recording of onsite observations will be made, according to current professional standards. Any alteration or introduction of new material will be identified. Field notes, measurements, photographs, and/or maps will be made.

A complete and detailed pre-stabilization study will be made to identify structurally weak areas that may require work. Structurally sound portions of any structure will not be disturbed. A detailed and complete record of broken, as well as intact areas, will be made prior to any disturbance. Stabilization and repair work will be supervised by a professional archeologist.

Guided tours and interpretive literature will not, in any way, lead visitors to treat resources adversely and will support the value of a non-intrusive visit. Visitor use may be subject to limitations if use results in adverse effects on cultural properties.

Boundary fencing will be by chain-link fencing and steel rods for posts. No heavy equipment will be used. The fencing will keep cattle out that were destroying the archeological features in the past.

#### Adverse Effects which Cannot Be Avoided Should the Plan Be Implemented

Exotic plant control will involve minimal but nonetheless adverse soil disturbance in scattered soil pockets.

Archeological site work will, when necessary, entail some loss of in-place associations and removal of portable artifacts.

None of the plan actions will have an effect on threatened plant and animal species or their critical habitat.

## Relationship between Short-term Uses of the Human Environment and the Maintenance and Enhancement of Long-term Productivity

Propagation of native plants, exotic plant control, native plant reintroduction, and brush clearing will directly affect the sites subject to action. Harvesting native plants from the upland garden for park demonstrations is a short-term use; the garden productivity, under proper care, will yield a harvest for a long time. The coconut grove on the palace grounds, planted in 1904, is a significant example of long-term perpetuation. The cumulative, long-term effect of all phases of vegetative management will be a natural environment favoring native over exotic plant species.

Visitor accessibility to archeological sites and historic features and park interpretation of them comprise the short-term uses of the cultural resources. The 1916 Service mandate and the City of Refuge establishment act provide for public use. For this reason, resources management planning should allow a level of public use commensurate with resource protection. Archeological and historical management will include preservation, stabilization, and maintenance with minimal resource extraction. Resulting dates, patterns of use, and historic detail will help to inform both the professional and lay community. The range of stabilization work proposed will add to structural longevity and to the protection of the cultural resources. The proposed chief's house stabilization and Ki'ilae village restoration will provide future visitors with interpreted features unavailable to present visitors. The long-term effect of stabilization work will be a long-lived cultural environment for present and future public benefit, and the long-term effect of the new, proposed facilities will help to better manage the park and interpret the park for the people.

### Irreversible and Irretrievable Commitments of Resources Which Would Be Involved in the Proposed Plan

None of the vegetative management actions will have an irreversible effect on wildlife habitat or an irretrievable effect on archeological evidence. Soil loss will be negligible.

Stabilization and repair work will have irretrievable effects. About 5 per cent of the beach adjoining the Old Heiau site will be destroyed from test trenching for information. Other projects will involve some restacking of rock bases and removal of portable artifacts.



## Alternatives to the Proposed Projects

### ALTERNATE VEGETATIVE MANAGEMENT

No action. An alternative to each phase of vegetative management is no action. Although conditions prior to park establishment required massive vegetative clearing, quick and successful reinvasion of exotic plants since then indicates the need for ongoing control. Dominance of kiawe and other shrubs is readily apparent within the park and in surrounding areas. It is clear that a no action alternative would result in firmly established exotics, encroaching on the historic scene and destroying archeological remains. Fuel build-ups, presently concentrated near park developments, would eventually amount to a critical fire hazard. In such case, visitor safety would decrease and buildings protection would be difficult. An uncontrolled fire could cause irreparable damage to archeological resources, invalidate carbon 14 dating, and crack and dull lava. The detached parcel would remain overgrown with exotics and its potential use for supplying native Hawaiian plants to the park would be lost.

Brush clearing by massive herbicide application. Since the area subject to vegetative clearing totals about 125 acres, massive herbicide treatment may be feasible. The dense and hardy thickets of kiawe and haole koa may require repeated treatments to penetrate and prevent sprouting. Although this method may be more expedient than manual removal, its effectiveness might be only partial and short-lived. Broadcast spraying would leave unsightly dead, standing vegetation for a year or more; natural decomposition would take years longer. Even then, it is not certain whether native plants would reestablish or exotics would invade the treated area. Potential impacts include contamination of the bay through percolation, aerial drift of herbicide onto adjoining ranchlands, and a health hazard to visitors.

Cutting, piling and burning. Climatic conditions are often optimum for burning; however, vegetation interspersed among lava flows probably could not carry a fire. Flash fires in scattered soil pockets to remove exotic grasses and forbs are possible. Cutting, piling, and burning are other specific ways to dispose of the large volume of vegetation and all viable seeds. Such a management action would require trained personnel and close supervision so that the fire would always be under control. It is probable, but not certain, that the fire's sanitizing effect would provide conditions for native plant reestablishment. Cultural resources would be affected directly and indirectly: surficial archeological evidence may be consumed by fire; carbon 14 dating could be invalidated; previously overgrown archeological evidence may be uncovered; and nearby historical and archeological features would be vulnerable to a fire temporarily out of control. Burning intensity could easily reach the point when lava is cracked and loses its sheen. Despite archeological clearance and other preventive measures,



the use of fire on historical property requires considerable caution due to potential irretrievable losses.

#### ALTERNATE HISTORIC PRESERVATION

No action. No action at the Old Heiau site means allowing the remaining 20 per cent of the site to deteriorate from high seas with loss of pre-historic structural data and loss or destruction of portable artifacts. The natural environment would not be disturbed. No action would amount to a violation of 36 CFR 800.9 (e).

No action on the Alahaka-Keanaee ruins, Keokea temple sites, or Ki'ilae village means allowing these structures and features to deteriorate from natural forces including destruction by roots from exotic trees and shrubs and by visitor impacts.

Land acquisition at Ki'ilae village would not be accomplished. Ki'ilae village would not be accessible as a complementary example of post-1790 and modern Hawaiian life.

A no action alternative would place a greater burden of protection on the limited park staff in face of increasing visitor use. On the other hand, original associations would remain undisturbed and would provide more information in the future when research techniques become more refined. Except for the Old Heiau site, none of the proposed ruins stabilization actions will reduce the potential for future research.

Other alternative methods for protection of these ruins include closing certain sites to visitors; patrol fishing areas (now being done); guided tours only; increase patrol force to control persons vandalizing the ruins; and realign trails away from delicate features (trails are historic and are a resource in themselves). However, they ignore the central problem of the effects of the natural forces-- sea, wind, rain, vegetation, earthquakes --that are reducing the research and interpretive potential. Therefore, it must be understood that these proposed actions of ruins stabilization are only to the extent necessary to preserve them for further investigations and are considered as minimal or basic stabilization for ongoing maintenance.

Stabilization only. A program of stabilization only would include most of the proposed actions. Stabilization would arrest erosion processes by selected treatment with maximum information retrieval and minimum disturbance of resources. In this case, methodology is closely linked to impacts. Although not planned, the use of cement,

for example, has beneficial and adverse effects; it will hold up well to the elements, but would introduce modern materials to achieve a seemingly ancient structure. There are strong public objections to this method of stabilization. Dry wall stabilization, re-stacking of original building stones in the Hawaiian style, may require continued maintenance, but would more closely resemble the Hawaiian style of construction. Stabilization results in partial loss of original in-place association of artifacts, structures, and site as they presently exist.

Conservation only. Except for the full-scale studies at the Old Heiau site, all plans for preservation are aimed at conservation; i.e., selected treatment with maximum information retrieval and minimum disturbance of resources. Trail alignments for historical and natural history interpretations are designed for maximum protection of all resources.

Excavation for pure research. Excavation, whether selective or extensive, carry certain irretrievable impacts which are not acceptable, as indicated in the following discussion.

Extensive excavation. This alternative comprises the most complex archeological work and the greatest impacts. The numerous archeological sites in the park would yield heretofore unavailable information on dates, artifacts, and structural detail. Excavation amounts to an irretrievable commitment of cultural resources. Trenches would result in soil disturbance as well as aesthetic intrusions. Unearthing human remains on a large scale may result in unpredictable and potentially controversial issues with the local Hawaiian community.

Original associations and site content would be permanently altered and unavailable for future research and professional standards of information retrieval. From past experience, archeological excavation yields have increased geometrically with modern technology. For this reason, the benefits of excavation are short-term and detrimental to long-term productivity. With the exception of excavation at the Old Heiau site, where the site is being destroyed by high seas, there will be no extensive excavations in the park.

Sewage lift station. If no action were taken, the sewage lift station would stay where it is and continue to be an encroachment on the historic scene and cause noise pollution of the scene with its intermittent humming, night and day. The lift station would also continue to be right on the shore of a historic cove, with a remote possibility of sewage leaking into the cove.

## Consultation and Coordination

During the preparation of the resources management plan and environmental assessment, sources outside the Service were consulted for their knowledge and recommendations.

On November 11 and 12, 1974, Superintendent Jerry Shimoda, Pacific Archeologist Edmund Ladd, and Pacific Historian Russell Apple accompanied the State Historic Preservation Officer's representative, Beth Walton, on a tour of the park grounds. Onsite inspection of proposed archeological work led to further discussions and preliminary clearance.

On February 5, 1975, the Superintendent and Resources Specialist Francis Jacot met with Forest Service personnel. Henry Debruin, Douglas Baker, Charles Philpot, and Robert Nelson of the Division of Cooperative Fire Control were present for an onsite survey. At that time, vegetative management alternatives were discussed and caution expressed on any use of fire.

The following organizations will receive review copies of the plan and environmental assessment:

- Advisory Council on Historic Preservation
- Department of the Army
  - Corps of Engineers
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of the Interior
  - Bureau of Outdoor Recreation
  - Fish and Wildlife Service
  - Geological Survey
- Department of Transportation
- Civil Service Commission
- Environmental Protection Agency
- State of Hawaii Clearinghouse
  - State Historic Preservation Officer
- Department of Education
- Department of Land and Natural Resources
  - Fish and Game Division
  - Forestry Division
  - Land Management Division
  - State Parks Division
- State Land Use Commission
- Department of Transportation
  - Harbors Division
  - Highways Division
- University of Hawaii
  - Experiment Station (Kainaliu, Kona)
- County of Hawaii
  - Office of the Mayor

County Council  
Planning Department  
Parks and Recreation  
Public Works  
Aboriginal Lands of Hawaiian Ancestry  
Association of Hawaiian Civic Clubs  
Audubon Society  
Bernice Pauahi Bishop Museum  
Bernice Pauahi Bishop Estate  
Catholic Diocese  
Congress of the Hawaiian People  
Conservation Council of Hawaii  
Friends of the Earth  
Hale o Hooponopono  
Hawaii Visitors Bureau  
Kai-o-pua Canoe Club  
Ka Leo o Na Pua o Hawaii  
Kamehameha Schools  
Keoua Canoe Club  
Kona Conservation Group  
Kona Hawaiian Civic Club  
Kona Iki Trollers  
Kona Mauka Trollers  
Kona Outdoor Circle  
Life of the Land  
McCandless Estate  
Sierra Club  
State Foundation for History and Humanities  
State Historic Site Review Board  
The Hawaiians  
The Nature Conservancy  
Te Anaina o Ta Hoomana Hawaii Pono

Any letters of comment received will be reviewed by the Superintendent for implementation. Copies of the plan and assessment will be available at City of Refuge National Historical Park, State Director's Office in Honolulu, and the Western Regional Office.

The following are preliminary letters of comment from the State Historic Preservation Officer and the Advisory Council on Historic Preservation.





CHRISTOPHER COBB, CHAIRMAN  
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU  
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
P. O. BOX 621  
HONOLULU, HAWAII 96809

DIVISIONS:  
CONVEYANCES  
FISH AND GAME  
FORESTRY  
LAND MANAGEMENT  
STATE PARKS  
WATER AND LAND DEVELOPMENT

March 31, 1975

Mr. Robert L. Barrel  
State Director  
United States Department of the Interior  
National Park Service  
Hawaii Group  
677 Ala Moana Boulevard, Suite 512  
Honolulu, Hawaii 96813

Dear Mr. Barrel:

SUBJECT: Natural and Cultural Resources Management  
Plan and Environmental Assessment - City of  
Refuge National Historical Park

Thank you for the opportunity to review this document. I was pleased at the detail of information and its concern for the cultural resources at City of Refuge National Historical Park.

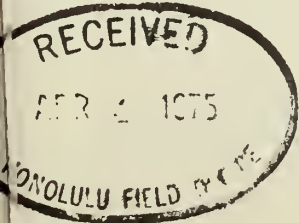
In applying the criteria given in 36 CFR part 800, I find that certain of your proposed undertakings, in particular those involving archaeological excavation and restoration, must be determined as having adverse effects. However, if the control measures outlined in this document are followed by the Park Service in these undertakings, the adverse effects will be adequately mitigated.

I suggest that when undertakings that involve archaeological excavation or restoration are in the actual planning stages, individual memoranda of agreement be prepared for them.

Your interest in historic preservation is greatly appreciated.

Very truly yours,

*Edgar A. Hamasu*  
for CHRISTOPHER COBB  
Historic Preservation Officer  
State of Hawaii



Advisory Council  
On Historic Preservation  
1522 K Street N.W. Suite 430  
Washington D.C. 20005

MAY 13 1978

Mr. John H. Davis  
Acting Regional Director  
Western Regional Office  
National Park Service  
Department of the Interior  
450 Golden Gate Avenue, Box 36063  
San Francisco, California 94102

MAY 13 1978	
Regional Director	
Dep. Regional Dir.	
Exec. Asst.	
EEG	
Public Affairs	
Operations Eval.	
Administration	
Park System Mgmt.	
Professional Svc.	PR SIG
Action taken: 5/16	

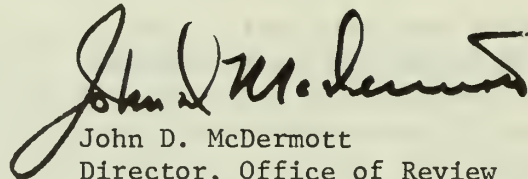
Dear Mr. Davis:

On April 7, 1975 the Advisory Council received the National Park Service's (NPS) adequately documented determination that the piecemeal renewal of coconut groves, brush clearing, historic structures maintenance, cultural demonstrations, visitor circulation trails, and boundary adjustments at City of Refuge National Historic Park would have no adverse effect on that property which is included in the National Register of Historic Places. The Council staff has reviewed NPS's determination of no adverse effect and notes no objection to the determination.

In accordance with Section 800.4(d) of the Advisory Council's "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800) NPS may proceed with the undertaking.

Your continued cooperation is appreciated.

Sincerely yours,



John D. McDermott  
Director, Office of Review  
and Compliance

### Literature Cited

- Apple, Russell A. and Gordon A. Macdonald. 1966. The rise of sea level in contemporary times at Honaunau, Kona, Hawaii. *Pacific Science* 20(1): 126-136.
- Bryan, Edwin H., Chester K. Wentworth, Amy Greenwell, Marie C. Neal, Amy Suehiro and Alison Kay. 1957. The natural and cultural history of Honaunau, Kona, Hawaii. Vol. 1. The natural history of Honaunau. B. P. Bishop Museum, Honolulu, Hawaii. 149 pp. Mimeo.
- Doty, Maxwell S. 1969. The ecology of Honaunau Bay, Hawaii. *Hawaii botanical science paper no. 14*. University of Hawaii, Honolulu, Hawaii. 221 pp. Mimeo.
- Emory, Kenneth P., John F. G. Stokes, Dorothy B. Barrere and Marion A. Kelly. 1957. The natural and cultural history of Honaunau, Kona, Hawaii. Vol. II. The cultural history of Honaunau. B. P. Bishop Museum, Honolulu, Hawaii. 247 pp. Mimeo.
- Jackson, Frances. 1966. Ki'ilae village, South Kona, Hawaii. Honolulu, Hawaii. 76 pp. Mimeo.
- Vaughan, Thomas. 1968. Kona's great wall poses unanswered questions. *Hawaii Orchid Isle* 3: 2.
- Westervelt, W. D. 1916. Hawaiian legends of volcanoes. Honolulu, Hawaii. 205 pp.
- Yen, Douglas E. 1971. An ethnobotanical survey of the national parks at Honaunau and Kalapana on the island of Hawaii and Kipahulu, Maui. B. P. Bishop Museum, Honolulu, Hawaii. 26 pp. Mimeo.

Negative Declaration

Department of the Interior

National Park Service

CITY OF REFUGE NATIONAL HISTORICAL PARK

Hawaii

Western Region

In compliance with the National Environmental Policy Act of 1969, the National Park Service has prepared an environmental assessment on the following proposed project:

Natural and Cultural Resources Management Plan  
City of Refuge National Historical Park

The assessment process did not indicate a significant environmental impact from the proposed action. Consequently, an environmental statement will not be prepared.

September 3, 1976  
Date

Jerry V. Shinoda  
Superintendent

November 2, 1976  
Date

Louise W. Chapman  
Regional Director, Western Region



## MANAGEMENT PROGRAM

The management program that is appended to the plan is the action document that is designed to implement the plan. The management program consists of:

Natural and Cultural Resources Project Statements that will serve as "blueprints" for proposed actions.

A Natural and Cultural Resources Project Programming Sheet on which each project will be listed and shown in relation to park priority and funding, and a time sequence for the five-year period.

A List of Natural and Cultural Resources Projects on which currently active and proposed resource activities are summarized.

While the natural and cultural resources management plan is concerned with a proposed long-term action program, the management program deals with the next five years only. The program presented here begins with Fiscal Year 1976. Each subsequent year, the management program will be revised and updated for a new five-year period as work is completed and new projects are proposed.

## List of Natural and Cultural Resources Projects

### City of Refuge National Historical Park

The following is a list of proposed resources projects:

<u>Reference No.</u>	<u>Project Title</u>	<u>Status of Project</u>
RM-1	Exotic Plant Removal	Proposed
RM-2	Upland Garden	Proposed
RM-3	Fire Fuel Brush Clearing	Proposed
RM-4	Boundary Survey and Fencing	Proposed
RM-5	Hazardous Coconut Trees	Proposed
A-1	Refuge Area Ruins	Proposed
A-2	Alahaka-Keanaee	Proposed
A-3	Keokea Temple	Proposed
A-4	Chief's Housing	Proposed
A-5	Holua Slide	Proposed
H-1	Ki'ilae Village	Proposed
N-1	Marine Study	Proposed

Key: RM = resource management action, N = natural science study,  
A = archeological project, H = historical project,  
W = water resources project

# NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Exotic Plant Removal (CIRE-RM-1)
3. STATEMENT OF PROBLEM: Certain areas of the park are overgrown with exotic plant species. The removal of these species is consistent with the maintenance of the historic scene.
4. WHAT HAS BEEN DONE: The mass application of chemical herbicides in the past resulted in chemical seepage into Honaunau Bay.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Manually remove exotic species from park and spot treat stumps with appropriate herbicide.
6. LENGTH OF TIME NEEDED: This will be a continuing project since regrowth will be a constant factor and adjacent lands are overgrown with the same species.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: The exotics will continue to present an inaccurate view of the park in its historic context. Their continued growth will impede foot travel in those areas of the park where the exotics thrive, and damage to historic and pre-historic remains may occur from expanding root growth.
8. WHAT ARE THE ALTERNATIVES: (1) Burn the area causing non-selective control of all vegetation; (2) use mass application of chemical herbicides and accept ecological damage to Honaunau Bay; (3) take no action.
9. PERSONNEL: This should be done with Service personnel.
10. ADMINISTRATION AND LOGISTICS: This would be a continuing project.

## FUNDING

	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal Services	20,000	15,000	15,000	15,000	10,000
Other Than Personal Services					
GRAND TOTAL	20,000	15,000	15,000	15,000	10,000
Funds available in park base		15,000	15,000	15,000	10,000

Funds requested  
from Regional  
Office

20,000

On Form

Date Submitted

10-237

March 11, 1975

11. REFERENCES AND CONTACTS: Mr. Jerry Y. Shimoda, Superintendent,  
City of Refuge NHP
12. DATE OF SUBMISSION: June 26, 1973



## NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Upland Garden of Native Plants  
(CIRE-RM-2)
3. STATEMENT OF PROBLEM: The replanting program and the cultural demonstration for City of Refuge require supplies of native plants. These plants are scattered on private land, but not available in quantities needed for the projects.
4. WHAT HAS BEEN DONE: Some plants have been growing in the main park area and park employees and friends of the park supply materials from their home gardens.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The garden area is covered with exotic plants and only a few native plants exist. After the area is cleared of exotic plants, native plants must be replanted and cared for as a nursery and, secondarily, as an exhibit for visitors. The area will serve both City of Refuge and Puukohola Heiau NHS in their native plant replanting programs.
6. LENGTH OF TIME NEEDED: After initial clearing and facilities, the project will be continuing in nature.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: The replanting programs will be haphazard and costly and cultural demonstrations will be limited.
8. WHAT ARE THE ALTERNATIVES: Take no action.
9. PERSONNEL: The initial clearing and utility facilities could be by contract. The planting program should be done by Service personnel.
10. ADMINISTRATION AND LOGISTICS: This may be done at any time of the year under the supervision of the park Maintenance Foreman.

### FUNDING

	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services	10,000	10,000	10,000	10,000	10,000
Other than personal services	10,000	2,000	2,000	2,000	2,000
GRAND TOTAL	20,000	12,000	12,000	12,000	12,000

Funds available in  
park base

Funds requested  
from Regional  
Office

20,000 12,000 12,000 12,000 12,000

On Form

Date Submitted

10-237

September 20, 1973

11. REFERENCES AND CONTACTS: Mr. Jerry Y. Shimoda, Superintendent,  
City of Refuge NHP
12. DATE OF SUBMISSION: June 10, 1974

# NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Fire Fuel Brush Clearing (CIRE-RM-3)
3. STATEMENT OF PROBLEM: Areas of the park adjacent to the historic and developed area have become overgrown with exotic species. The recent period of heavy rain has accelerated this growth. When weather patterns return to normal, the growth will dry out and become an extreme fire hazard.
4. WHAT HAS BEEN DONE: The maintenance staff has removed the growth around buildings, however, it returns quickly and the limited staff cannot keep up with the needs.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The manual removal of the plants to leave a minimum of fuel in case of fire.
6. LENGTH OF TIME NEEDED: This will be a continuous project since with average rainfall, growth will continue.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: The excess of fuel could result in a damaging fire, burning the coconut grove, administration, maintenance and residence area as well as possible damage to archeological remains.
8. WHAT ARE THE ALTERNATIVES: (1) Burn the area in a controlled manner requiring the unlikely combination of professional skill, a large control force, special equipment and cooperating weather conditions; (2) mass application of chemical herbicides and accept ecological damage to the fragile marine environment; (3) take no action.
9. PERSONNEL: This could be done by contract, but because of its continuing nature, Service personnel are more feasible.
10. ADMINISTRATION AND LOGISTICS: This project would be under the supervision of the Maintenance Foreman.

## FUNDING

	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services	30,900	30,900	30,900	30,900	30,900
Other than personal services					
GRAND TOTAL	30,900	30,900	30,900	30,900	30,900

Funds available in park base	30,000	30,000	30,000	30,000	30,000
Funds requested from Regional Office	9,000	9,000	9,000	9,000	9,000

<u>On Form</u>	<u>Date Submitted</u>
----------------	-----------------------

10-237	March 13, 1975
--------	----------------

11. REFERENCES AND CONTACTS: Mr. Jerry Y. Shimoda, Superintendent,  
City of Refuge NHP

12. DATE OF SUBMISSION: November 1974



## CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Boundary Survey and Fencing (CIRE RM-4)
3. STATEMENT OF PROBLEM: Boundary survey and fencing most of the park's east boundary and the entire south boundary to protect the park's archeological artifacts and sites from neighboring ranchers' cattle after the boundary expansion is accomplished.
4. WHAT HAS BEEN DONE: A temporary fence has been put up along the park's present mauka boundary.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: After the expansion of the park's boundaries, a boundary survey must be made, before the metal fence is installed. Some vegetation will be left on the seaward side of the fence to hide it from view. The area is presently rocky and thick with vegetation.
6. LENGTH OF TIME NEEDED: Boundary survey and fence (four months).
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: Neighboring cattle grazing in our boundaries will damage archeological artifacts and sites.
8. WHAT ARE THE ALTERNATIVES: No action
9. PERSONNEL: The boundary survey and fence work can be done by contract. The maintenance of the fence can be done by park personnel.
10. ADMINISTRATION AND LOGISTICS: This may be done at any time of the year under the supervision of the Park Maintenance Foreman.

### FUNDING

### Year in Program Sequence

	1st	2nd	3rd	4th	5th
Personal Services					
Other than Personal Services			46,000		
GRAND TOTAL			46,000		
Funds available in park base					
Funds requested from Regional Office			46,000		

On Form

Date Submitted

10-238

September 23, 1975

11. REFERENCE AND CONTACTS: Mr. Jerry Y. Shimoda, Superintendent, City of Refuge National Historical Park.
12. DATE OF SUBMISSION: September 1976

## NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Hazardous Coconut Trees (CIRE-RM-5)
3. STATEMENT OF PROBLEM: 35 coconut trees are rapidly reaching the recommended age for removal on the palace grounds and refuge area where 90% of our visitors walk. They are posing a definite threat to life and property.
4. WHAT HAS BEEN DONE: A few trees have been removed and replaced with younger shorter trees.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Cutting down of the old coconut trees, disposing and planting younger and shorter trees.
6. LENGTH OF TIME NEEDED: Three weeks for the cutting, disposing and transplanting of coconut trees.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: If this work is not done, the trees will fall and cause loss of life or injury to persons and property. We also fear for the life of our maintenance worker who climbs these trees to remove the dead fronds and coconuts to protect the visitors.
8. WHAT ARE THE ALTERNATIVES: (1) Cut down the dangerous coconut trees, but this will leave the palace grounds area bare, and the atmosphere of the area will be gone; (2) no action.
9. PERSONNEL: The cutting, disposing, and replanting can be done by a contractor.
10. ADMINISTRATION AND LOGISTICS: This may be done at anytime of the year under the supervision of the Park Maintenance Foreman.

FUNDING	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal Services	2,000	2,000	2,000	2,000	2,000
Other than personal services	10,000		10,000		
GRAND TOTAL	12,000	2,000	12,000	2,000	2,000
Funds available in park base					
Funds requested from Regional Office	10,000				

On Form

Date Submitted

10-237

April 22, 1974

11. REFERENCES AND CONTACTS: Mr. Jerry Y. Shimoda, Superintendent, City of Refuge National Historical Park
12. DATE OF SUBMISSION: September 1976



# CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Refuge Area Ruins Stabilization (CIRE-A-1)
3. STATEMENT OF PROBLEM: The most important archeological site within the Place of Refuge at Honaunau is the old temple site. The preservation of this temple site is paramount to the proper interpretation of the pre-history and history of the City of Refuge. Due to seasonal high seas and increased visitor use, valuable pre-historic structural data and portable artifacts are being destroyed at an alarming rate.
4. WHAT HAS BEEN DONE: Preliminary estimates and proposal for the project have been completed. The remains are currently exposed to high seas and visitor use, both damaging what remains of an important site.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Excavation, stabilization, restoration, and interpretation of refuge area, especially the "old temple site," but also including the midden and sandy areas inside the refuge.
6. LENGTH OF TIME NEEDED: One year.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: Information necessary to complete the interpretive story of the park will be lost.
8. WHAT ARE THE ALTERNATIVES: Take no action.
9. PERSONNEL: To be done by day labor.
10. ADMINISTRATION AND LOGISTICS: This could be accomplished at any time of the year under the supervision of the Pacific Archeologist.

FUNDING	Year in Program Sequence				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services	125,760				
Other than personal services	8,175				
GRAND TOTAL	133,935				

Funds available in  
park base

Funds requested  
from Regional  
Office

133,935

On Form

Date Submitted

10-238

October 21, 1976

11. REFERENCES AND CONTACTS: Mr. Edmund J. Ladd, Pacific Archeologist
12. DATE OF SUBMISSION: June 10, 1974

## CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Alahaka-Keanaee Ruins Stabilization (CIRE-A-2)
3. STATEMENT OF PROBLEM: This area within the park is necessary to complete the interpretive theme of the park. Minor resource disturbance will occur.
4. WHAT HAS BEEN DONE: At such investigation sites in the past, the area is disturbed only to the extent necessary to carry on the work.
5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN: Excavate, stabilize and restore the sites.
6. LENGTH OF TIME NEEDED: 24 weeks.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: Because of increasing visitation to the areas, data is being lost. If neglected in the future, these important sources of data will be irretrievably lost.
8. WHAT ARE THE ALTERNATIVES: Take no action.
9. PERSONNEL: This should be done by Service personnel.
10. ADMINISTRATION AND LOGISTICS: This could be accomplished at any time of the year under the supervision of the Pacific Archeologist.

### FUNDING

	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services				24,500	
Other than personal services				2,100	
GRAND TOTAL				26,600	

Funds available in  
park base

Funds requested  
from Regional  
Office

26,600

On Form

Date Submitted

10-238

October 21, 1976

11. REFERENCES AND CONTACTS: Mr. Edmund J. Ladd, Pacific Archeologist
12. DATE OF SUBMISSION: June 2, 1973



## CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Keokea Temple Ruins Stabilization (CIRE-A-3)
3. STATEMENT OF PROBLEM: This area within the park is necessary to complete the interpretive theme of the park. Minor resource disturbance will occur.
4. WHAT HAS BEEN DONE: At such investigation sites in the past, the area is disturbed only to the extent necessary to carry on the work.
5. DESCRIPTION OF THE WORK TO BE UNDERTAKEN: Excavate, stabilize and restore the sites.
6. LENGTH OF TIME NEEDED: 26 weeks.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: Because of increasing visitation to the areas, data is being lost. If neglected in the future, these important sources of data will be irretrievably lost.
8. WHAT ARE THE ALTERNATIVES: Take no action.
9. PERSONNEL: This should be done by Service personnel.
10. ADMINISTRATION AND LOGISTICS: This could be accomplished at any time of the year under the supervision of the Pacific Archeologist.

FUNDING	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services			53,100		
Other than personal services			3,700		
GRAND TOTAL			56,800		
Funds available in park base					
Funds requested from Regional Office			56,800		

<u>On Form</u>	<u>Date Submitted</u>
10-238	Being Revised

11. REFERENCES AND CONTACTS: Mr. Edmund J. Ladd, Pacific Archeologist

12. DATE OF SUBMISSION: June 26, 1973

# CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Chief's House Complex Stabilization (CIRE-A-4)
3. STATEMENT OF PROBLEM: At present there is no interpretation of the important aspect of the park story. These archeological remains are located adjacent to the visitor use area. The complex is a classified structure on the national register.
4. WHAT HAS BEEN DONE: Basic ground survey and estimates have been completed by the Pacific Historian.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Stabilize and repair rock walls and platforms of site.
6. LENGTH OF TIME NEEDED:
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN:
8. WHAT ARE THE ALTERNATIVES: Take no action.
9. PERSONNEL: This should be done by day labor.
10. ADMINISTRATION AND LOGISTICS: The project may be done at any time of the year under the supervision of the Pacific Archeologist.

FUNDING	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services		2,000			
Other than personal services					
GRAND TOTAL		2,000			

Funds available in  
park base

Funds requested  
from Regional  
Office

2,000

On Form

Date Submitted

10-238

October 21, 1976

11. REFERENCES AND CONTACTS: Mr. Edmund J. Ladd, Pacific Archeologist
12. DATE OF SUBMISSION: June 10, 1974



# CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Restore Holua Slide (CIRE-A-5)
3. STATEMENT OF PROBLEM: This archeological remain is seldom found in Hawaii. Its restoration is necessary to complete the interpretive story of the park.
4. WHAT HAS BEEN DONE: Basic research has been completed by the Pacific Historian and Pacific Archeologist.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Restoration of rock sledding track with surface of grass, ready for use, including construction of sleds and restoration of trail to head of slide.
6. LENGTH OF TIME NEEDED: Eight weeks.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: This rare remnant of the Hawaiian culture will continue to deteriorate and another aspect of the culture will be lost.
8. WHAT ARE THE ALTERNATIVES: Take no action.
9. PERSONNEL: This should be done by day labor.
10. ADMINISTRATION AND LOGISTICS: The project may be done at any time of the year under the supervision of the Pacific Archeologist and the Pacific Historian.

## FUNDING

	Year in Program Sequence				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services					21,000
Other than personal services					

GRAND TOTAL		21,000
-------------	--	--------

Funds available in  
park base

Funds requested  
from Regional  
Office

21,000

On Form

Date Submitted

10-238

October 5, 1973

11. REFERENCES AND CONTACTS: Mr. Russell A. Apple, Pacific  
Historian

12. DATE OF SUBMISSION: June 10, 1974

# CULTURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, WR
2. PROJECT NAME AND NUMBER: Ki'ilae Village Stabilization and Restoration (CIRE-H-1)
3. STATEMENT OF PROBLEM: The Ki'ilae village area represents Hawaiian occupancy from pre-history to 1926. It is an important transitional aspect of the interpretive program connecting the pre-1970 story of the park to the recent past.
4. WHAT HAS BEEN DONE: The basic field surface survey of sites has been completed.
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: Stabilization and selective restoration of this village. Land acquisition must precede the project.
6. LENGTH OF TIME NEEDED: 36 weeks.
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: An important source of Hawaiian history will be lost through neglect and deterioration.
8. WHAT ARE THE ALTERNATIVES: Take no action.
9. PERSONNEL: This should be done by day labor.
10. ADMINISTRATION AND LOGISTICS: This may be done at any time of the year under the direction of the Pacific Archeologist.

## FUNDING

	<u>Year in Program Sequence</u>				
	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4th</u>	<u>5th</u>
Personal services				98,500	
Other than personal services				1,000	
GRAND TOTAL				99,500	

Funds available in  
park base

Funds requested  
from Regional  
Office

99,500

On Form

Date Submitted

10-238

September 20, 1973

11. REFERENCES AND CONTACTS: Edmund J. Ladd, Pacific Archeologist
12. DATE OF SUBMISSION: June 10, 1974



## NATURAL RESOURCES PROJECT STATEMENT

1. PARK AND REGION: City of Refuge National Historical Park, Western Region
2. PROJECT NAME AND NUMBER: Marine Study (CIRE N-1)
3. STATEMENT OF PROBLEM: A marine study is needed to gather data on the edible marine resources that encouraged the Hawaiian people to settle here, for interpretive purposes. This study will also help us in our environmental programs. We will not have a complete cultural program if we are unable to determine marine resources which the Hawaiians depended on for food.
4. WHAT HAS BEEN DONE: No action taken
5. DESCRIPTION OF WORK TO BE UNDERTAKEN: The CPSU-UH unit will make an underwater study of the marine life in Honaunau Bay. They will produce a finished report geared toward our interpretive needs.
6. LENGTH OF TIME NEEDED: Two months
7. WHAT WILL HAPPEN IF PROJECT NOT UNDERTAKEN: We will not be able to tell park visitors the various types of tropical fishes available in the immediate area, and our interpretation will be incomplete.
8. WHAT ARE THE ALTERNATIVES: No action
9. PERSONNEL: The study can be done by a contractor.
10. ADMINISTRATION AND LOGISTICS: This project will be done by CPSU-UH.

### FUNDING

### Year in Program Sequence

	1st	2nd	3rd	4th	5th
Personal Services					
Other than Personal Services	24,700				
GRAND TOTAL	24,700				
Funds available in park base					
Funds requested from Regional Office	24,700				

On Form

Date Submitted

10-237

January 3, 1976

11. REFERENCE AND CONTACTS: Mr. Jerry Y. Shimoda, Superintendent, City of Refuge National Historical Park.
12. DATE OF SUBMISSION: September 1976

# NATURAL RESOURCES PROJECTS PROGRAMMING SHEET

City of Refuge National Historical Park, Hawaii

October 1976

Increase or Package No.		Area Pri- ority No.	Refer- ence No.	Project Title	NPS Costs Expressed in \$1000										Form No. & Date 10-250 10-237 10-238		No. of Contract
					Yr. 1 (77) BASE*	NEW**	Yr. 2 (78) BASE	NEW	Yr. 3 (79) BASE	NEW	Yr. 4 (80) BASE	NEW	Yr. 5 (81) BASE	NEW			
111		1	A-1	Refuge Area Ruins	-	133.9	-	-	-	-	-	-	-	-		10/21/76	
036		2	RM-3	Fire Fuel Brush Clearing	30.0	9.0	30.0	9.0	30.0	9.0	30.0	9.0	30.0	9.0		3/13/75	
103		3	A-4	Chief's Housing	-	-	-	2.0	-	-	-	-	-	-		10/21/76	
104		4	RM-2	Upland Garden	-	20.0	-	12.0	-	12.0	-	12.0	-	12.0		9/20/73	
110		5	A-3	Keokea Temple	-	-	-	-	-	56.8	-	-	-	-		10/21/76	
014		6	RM-1	Exotic Plant Removal	-	20.0	15.0	-	15.0	-	15.0	-	10.0	-		3/11/75	
012		7	RM-5	Hazardous Coconut Trees	2.0	10.0	2.0	-	2.0	10.0	2.0	-	2.0	-		4/22/74	
121		8	RM-4	Boundary Survey & Fencing	-	-	-	-	-	46.0	-	-	-	-		9/23/75	
032		9	N-1	Marine Study	-	24.7	-	-	-	-	-	-	-	-		1/3/76	
109		10	A-2	Alahaka-Keanaee	-	-	-	-	-	-	-	26.6	-	-		10/21/76	
102		11	H-1	Ki'ilae Village	-	-	-	-	-	-	-	99.5	-	-		9/20/73	
106		12	A-5	Holua Slide	-	-	-	-	-	-	-	-	-	21.0		10/5/73	
*BASE - Funds Available in Park Base					**NEW - Funds Requested from Regional Office										Page 1 of 1		







